: 974/4

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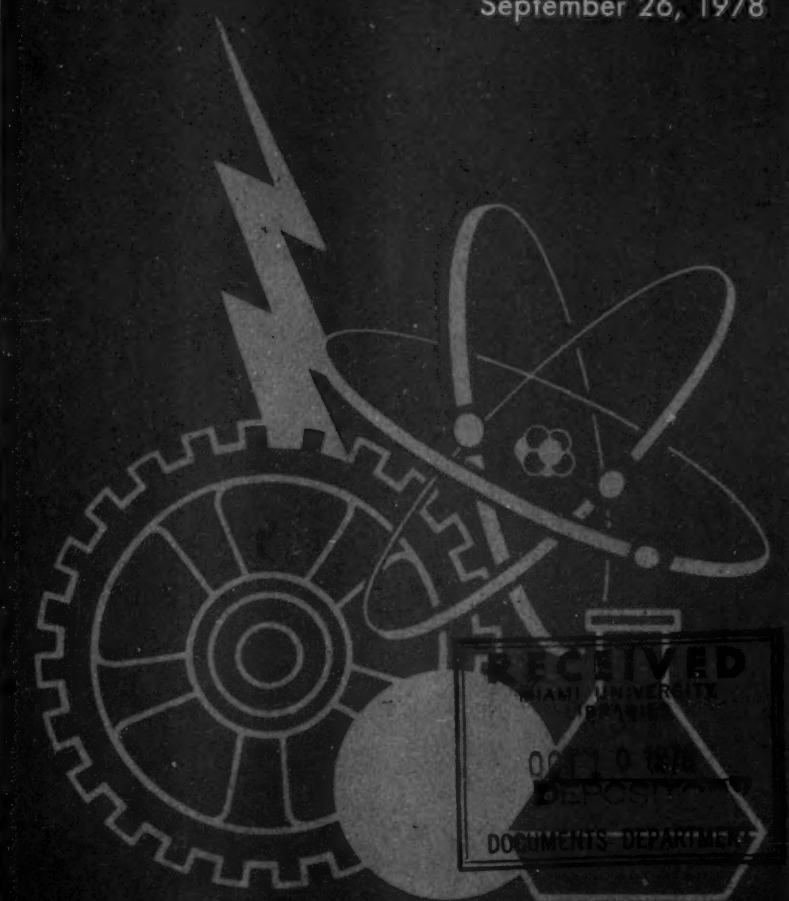
of the UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

September 26, 1978



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OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

September 26, 1978 Volume 974 Number 4

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty Information

For information concerning the PCT including the amounts of the fees thereunder and the States that may be designated in International applications consult the Notice entitled "Patent Cooperation Treaty (PCT) Implementation: Information for Prospective Applicants" appearing in the OFFICIAL GAZETTE of May 16, 1978.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

May 2, 1978.

Reinstatement of Patent Attorneys and Agents Registered to Practice Before the U.S. Patent and Trademark Office

Any person whose name has been removed from the Register of Attorneys or the Register of Agents pursuant to 37 CFR 1.347 may request reinstatement on the appropriate register. However, where the long lapse of time since removal or other circumstances indicate that the person may no longer be qualified for registration, the Committee on Enrollment may require the person to again show that he or she satisfies the requirements of 37 CFR 1.341(c) and that registration would be appropriate before reinstatement is granted.

LUTRELLE F. PARKER,
Chairman, Committee on Enrollment.

Aug. 21, 1978.

Report on Results of a June, 1978 Survey on the Citation by Applicants of Prior Art in Patent Applications

This report summarizes the data compiled from a sample of 724 allowed applications surveyed in the Office of Patent Program Control during the weeks of June 4 to June 17, 1978.

All applications in this survey were filed on or after July 1, 1977, the effective date of the establishment of new rules 37 CFR 1.97–1.99 relating to the citation of prior art by applicants.

For the purposes of the survey, a "citation," whether appearing in the specification or in a separate paper, is defined as (1) a listing of patents or publications together *with* a concise explanation of the relevance of each listed item [i.e. a prior art "statement" under 37 CFR 1.98(a)] or (2) a "mere listing" of patents or publications. In addition, a "reference" is defined as any patent or other publication cited by applicant.

This survey is similar to and presented in the same general format as the survey published in the Official Gazette of November 23, 1976, pages 1356 and 1357.

The statistics are presented without comment.

	Chem.	Elec.	Mech.	Total
(1) Number of applications in sample	247	190	287	724
(Percent of total)	34	26	40	100
Number of applications having citations submitted in:				
(2) Separate papers only	58	32	45	135
(Percent of sample 2/1)	24	17	16	19
(3) Both separate papers *and* in specification	7	7	20	34
(Percent of sample 3/1)	3	4	7	5
(4) The specification only	119	75	97	291
(Percent of sample 4/1)	48	39	34	40
(5) Total number of applications having citations	184	114	162	460
(Percent of sa mple 5/1)	74	60	56	64

Applications in which the applicant submitted citations in the *specification*.

	Chem.	Elec.	Mech.	Total
(6) Number of applications including citations in the specification	126	82	117	325
(Percent of applications having citations 6/1)	51	43	41	45
(7) Number of applications including mere listing of references in the specification	34	12	14	60
(Percent of applications having mere listing of references 7/1)	14	6	5	8
(8) Number of applications including prior art statements in the specification	93	70	103	266
(Percent of applications having prior art statements 8/1)	38	37	36	37
(9) Number of applications including prior art statements in the specification which included copies of the references	10	10	17	37
(Percent of applications, with statements, having copies of references 9/8)	11	14	17	14
(10) Number of applications having prior art statements in the specification which comply fully with the guidelines (37 CFR 1.97–1.99; MPEP § 609) (e.g. timely filed, translations where applicable, etc.)	10	10	13	33
(Percent of applications, with statements, in accordance with CFR and MPEP 10/8)	11	14	13	12
(11) Number of applications having prior art statements citing non-English documents in specification	55	12	12	79
(Percent of applications, with statements, citing non-English documents 11/8)	59	17	12	30
(12) Number of applications having prior art statements citing non-English documents in specification which included an English translation or English equivalent document	4	3	2	9
(Percent of applications, with statements, having translations of non-English documents 12/11)	7	25	17	11

Applications in which applicant submitted citations in *separate papers*.

	Chem.	Elec.	Mech.	Total
(13) Number of applications having citations in a separate paper	65	40	66	171
(Percent of applications having citations in separate papers 13/1)	26	21	23	24
(14) Number of separate papers having citations. (Note that 178 papers were filed in 171 applications. Of 171 applications, 165 had one paper, 5 applications had two papers and one application had three papers)	67	43	68	178

	Chem.	Elec.	Mech.	Total
(15) Number of separate papers having citations submitted within 3 months of the filing date of the application	50	35	51	136
(Percent of separate papers having citations submitted within 3 months 15/14)	75	81	75	76
Number of separate papers having citations filed later than 3 months after the filing date and after the first Office action which:				
(16) Included a statement explaining why the prior art was not earlier presented	2	1	3	6
(Percent of separate papers having citations including explanations for late filing 16/14)	3	2	4	3
(17) *Did not include* a statement explaining why the prior art was not earlier presented	15	7	14	36
(Percent of separate papers having citations not including explanation for late filing 17/14)	22	16	21	20
(18) Number of separate papers having citations which included a copy(s) of the reference(s)	53	38	51	142
(Percent of separate papers having citations including copy(s) of the reference(s) 18/14)	79	88	75	80
(19) Number of separate papers having citations which included a non-English document citation	26	8	7	41
(Percent of separate papers having citations citing non-English documents 19/14)	39	19	10	23
(20) Number of separate papers having citations which included an English translation or English language equivalent of a non-English document	10	3	2	15
(Percent of separate papers having translation etc., of non-English documents 20/19)	38	38	29	37
(21) Number of separate papers having prior art statements	63	28	42	133
(Percent of separate papers having prior art statements 21/14)	94	65	62	75
(22) Number of separate papers having citations which fully conformed with the guidelines (37 CFR 1.97-1.99; MPEP § 609)	41	20	27	88
(Percent of separate papers fully conforming with CFR and MPEP 22/14)	61	47	40	49

Applications (with statements in specification) grouped below according to numbers of references cited.

	Chem.	Elec.	Mech.	Total
(23) Number of applications including statements in the specification having a range of 1-5 references	73	57	88	218
(Percent of applications having statements in specification with 1-5 references 23/8)	79	81	85	82
(24) Number of applications including statements in the specification having a range of 6-10 references	14	13	10	37
(Percent of applications having prior art statements in specification with 6-10 references 24/8)	15	19	10	14
(25) Number of applications including statements in the specification having more than 10 references	6	0	5	11
(Percent of applications having statements in specification with 10 or more references 25/8)	6		5	4

Separate papers (with statements) grouped below according to numbers of references cited.

	Chem.	Elec.	Mech.	Total
(26) Number of separate papers including statements having a range of 1-5 references	41	19	34	94
(Percent of separate papers with 1-5 references 26/21)	65	68	81	71
(27) Number of separate papers including statements having a range of 6-10 references	8	6	6	20
(Percent of separate papers with 6-10 references 27/21)	13	21	14	15
(28) Number of separate papers including statements having more than 10 references	14	3	2	19
(Percent of separate papers with 10 or more references 28/21	22	11	5	41

Applications (with mere listings of references in specification and separate papers) grouped below according to number of references cited.

	Chem.	Elec.	Mech.	Total
(29) Number of applications having a range of 1-5 references	22	17	25	64
(Percent of applications having listings of 1-5 references 29/29+30+31)	57	63	64	61
(30) Number of applications having a range of 6-10 references	6	6	8	20
(Percent of applications having listings of 6-10 references 30/29+30+31)	15	22	21	19
(31) Number of applications having more than 10 references	11	4	6	21
(Percent of applications having listings of 10 or more references 31/29+30+31)	28	15	15	20

Dated: August 29, 1978.

DONALD W. BANNER,
Commissioner of Patents and Trademarks.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

D. 234,101, Re. S.N. 910,662, Filed Jun. 21, 1978, Cl. D6/26, STOOL, Philip Robert Salmon, et al., Owner of Record: *Inventors,* Attorney or Agent: Fred Wiviott, et al., Ex. Gp.: 290

3,809,845, Re. S.N. 930,641, Filed Jul. 31, 1978, Cl. 219/10.55, HEATING OF PRODUCTS IN ELECTRO-MAGNETIC FIELD, Lennart Arvid Stenstrom, Owner of

Record: *Alfa-Laval AB, Tumba, Sweden,* Attorney or Agent: Cyrus S. Hapgood, et al., Ex. Gp.: 213

3,886,979, Re. S.N. 930,866, Filed Aug. 3, 1978, Cl. 138/118.1, SHIRRED TUBULAR FOOD CASINGS HAVING A BARRIER COATING, Jerome J. M. Rasmussen, Owner of Record: *Union Carbide Corporation, New York, N.Y.,* Attorney or Agent: James C. Arvantes, et al., Ex. Gp.: 243

4,026,985, Re. S.N. 930,867, Filed Aug. 3, 1978, Cl. 264/129, SHIRRED TUBULAR FOOD CASINGS HAVING A BARRIER COATING, Jerome J. M. Rasmussen, Owner of Record: *Union Carbide Corporation, New York, N.Y.,* Attorney or Agent: James C. Arvantes, et al., Ex. Gp.: 147

PATENT NOTICES

Certificates of Correction for the Week of Sept. 26, 1978

P.P. 4213	4,064,379	4,075,569	4,082,880
D. 247,796	4,065,380	4,075,968	4,083,042
3,797,930	4,065,471	4,076,698	4,083,209
3,816,025	4,066,678	4,077,303	4,083,229
3,920,673	4,067,281	4,077,765	4,083,303
3,950,321	4,067,390	4,077,802	4,083,667
3,952,478	4,069,569	4,077,847	4,084,960
3,999,711	4,069,704	4,078,253	4,085,211
4,018,346	4,069,727	4,078,695	4,085,234
4,033,272	4,069,819	4,078,762	4,085,325
4,036,788	4,070,276	4,078,950	4,085,447
4,038,088	4,070,352	4,078,983	4,086,679
4,039,112	4,070,370	4,079,119	4,086,763
4,042,900	4,070,981	4,079,411	4,087,712
4,047,643	4,071,281	4,079,509	4,087,888
4,047,763	4,071,474	4,079,943	4,089,127
4,048,318	4,071,610	4,080,449	4,089,564
4,050,374	4,073,103	4,080,502	4,089,678
4,052,379	4,073,437	4,080,719	4,089,728
4,053,463	4,073,537	4,080,821	4,090,689
4,053,853	4,074,760	4,081,257	4,090,790
4,058,497	4,074,789	4,081,533	
4,058,546	4,075,108	4,082,060	
4,061,704	4,075,253	4,082,414	

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Notice of Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for domestic and possibly foreign licensing in accordance with the licensing policies of the agency-sponsors.

Copies of the patents cited are available from the Commissioner of Patents and Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
Patent Program Coordinator,
National Technical Information Service.

U.S. DEPARTMENT OF THE ARMY
Office of Judge Advocate General, Patent Division,
Room 2C-455 Pentagon, Washington, D.C. 20310

Patent 3,942,132. Combined Electron Beam Semiconductor Modulator and Junction Laser. Filed Sept. 6, 1974. Patented Mar. 2, 1976.

Patent 3,944,729. Stabilized Terrain Optical Position Sensor. Filed Mar. 25, 1975. Patented Mar. 16, 1976.

Patent 3,948,699. Hydrogen Gas Generators for Use in Chemical Lasers. Filed Nov. 8, 1974. Patented Apr. 6, 1976.

Patent 3,948,700. Method of Producing High Temperature Hydrogen. Filed Nov. 8, 1974. Patented Apr. 6, 1976.

Patent 3,950,862. Solar Cell Detector Array for Engagement Simulation. Filed Oct. 3, 1974. Patented Apr. 20, 1976.

Patent 3,952 583. Apparatus and Method for the Remote Detection of Vibrations of Diffuse Surfaces. Filed Jan. 2, 1975. Patented Apr. 27, 1976.

Patent 3,958,457. Electronically Operated Tipping-Bucket Rain Guage. Filed Sept. 26, 1975. Patented May 25, 1976.

Patent 3,959,659. Intense Energetic Electron Beam Assisted Fusion Neutron Generator. Filed Apr. 4, 1976. Patented May 25, 1976.

Patent 3,965,081. Isotactic and Syndiotactic Polyvinyl Nitrates and Processes for their Formation. Filed Jan. 21, 1974. Patented June 22, 1976.

Patent 3,965,749. Sampling and Dilution Method. Filed Mar. 19, 1975. Patented June 29, 1976.

Patent 3,967,121. Low Level Infrared Camera (LLIR Camera). Filed Sept. 10, 1975. Patented June 29, 1976.

Patent 3,972,864. Copolymers of Methyl Alpha-N-Alkylacrylate and Methyl Methacrylate. Filed Feb. 19, 1975. Patented Aug. 3, 1976.

U.S. DEPARTMENT OF ENERGY
Assistant General Counsel for Patents,
Washington, D.C. 20314

Patent 3,911,280. Method of Measuring a Profile of the Density of Charged Particles in a Particular Beam. Filed Apr. 11, 1974. Patented Oct. 7, 1975.

Patent 3,912,625. Method for Removing and Decolorizing Aqueous Waste Effluents Containing Dissolved or Dispersed Organic Matter. Filed Nov. 5, 1973. Patented Oct. 14, 1975.

Patent 3,914,054. Zeeman Effect Absorption Spectrometer. Filed Feb. 13, 1974. Patented Oct. 21, 1975.

Patent 3,914,373. Method for Separating Isotopes. Filed Jan. 20, 1973. Patented Oct. 21, 1975.

Patent 3,914,388. Volatilization of Iodine from Nitric Acid Using Peroxide. Filed Sept. 11, 1973. Patented Oct. 21, 1975.

Patent 3,916,200. Window for Radiation Detectors and the Like. Filed Sept. 4, 1974. Patented Oct. 28, 1975.

Patent 3,918,812. Diagnoses of Disease States by Fluorescent Measurements Utilizing Scanning Laser Beams. Filed May 7, 1973. Patented Nov. 11, 1975.

Patent 3,918,818. Method for Detection of Trichinellae. Filed Mar. 29, 1974. Patented Nov. 11, 1975.

Patent 3 919,273. Nonaqueous Actinide Hydride Dissolution and Production of Actinide Beta-Diketonates. Filed Aug. 23, 1974. Patented Nov. 11, 1975.

Patent 3,919,274. Nonaqueous Method for Dissolving Lanthanide and Actinide Metals. Filed Aug. 23, 1974. Patented Nov. 11, 1975.

Patent 3,920,577. Iodine Retention During Evaporative Volume Reduction. Filed July 16, 1974. Patented Nov. 18, 1975.

Patent 3,922,311. Fluorodinitroethyl Difluoroformal and Process of Manufacture. Filed May 10, 1972. Patented Nov. 25, 1975.

Patent 3,922,872. Iron Titanium Manganese Alloy Hydrogen Storage. Filed Feb. 4, 1975. Patented Dec. 2, 1975.

Patent 3,923,619. 018 Enrichment Process in U02F2 Utilizing Laser Light. Filed Sept. 16, 1974. Patented Dec. 2, 1975.

Patent 3,923,959. Method for Preparing Actinide Nitrides. Filed Nov. 28, 1973. Patented Dec. 2, 1975.

Patent 3,924,180. Potential Sensing Cell Analyzer. Filed Oct. 12, 1973. Patented Dec. 2, 1975.

Patent 3,925,036. Stage Design. Filed Mar. 23, 1951. Patented Dec. 9, 1975.

Patent 3 925,039. System for Treating Fuel Gas. Filed Nov. 18, 1974. Patented Dec. 9, 1975.

Patent 3,926,560. System for Detecting Gaseous Contaminants in Air. Filed Oct. 30, 1973. Patented Dec. 16, 1975.

Patent 3,926,953. Process for Producing 1,5-Diacetyl-3,7-Dinatro-1,3,5,7-Tetraazacyclooctane. Filed Dec. 5, 1974. Patented Dec. 16, 1975.

Patent 3,929 585. Production of Charcoal from Sawdust in a Fluidized Bed. Filed Aug. 16, 1972. Patented Dec. 30, 1975.

Patent 3,929,601. Synthesis of Pentafluorides. Filed Mar. 26, 1974. Patented Dec. 30, 1975.

Patent 3,929,979. Process for Generating Hydrogen. Filed Sept. 10, 1974. Patented Dec. 30, 1975.

Patent 3,929,980. Method of Producing Hydrogen. Filed Dec. 26, 1974. Patented Dec. 30, 1975.

Patent 3,932,300. System for Disposing of Radioactive Water. Filed Sept. 10, 1973. Patented Jan. 13, 1976.

Patent 3,936,633. Method of Determining Lanthanides in a Transition Element Host. Filed Jan. 16, 1975. Patented Feb. 3, 1976.

Patent 3,939,049. Process for Radiation Grafting Hydrogels onto Organic Polymeric Substrates. Filed Apr. 10, 1974. Patented Feb. 17, 1976.

Patent 3,943,062. Cryolite Process for the Solidification of Radioactive Wastes. Filed May 13, 1974. Patented Mar. 9, 1976.

Patent 3,943,204. Method for Improving the Extraction Properties of a Tributyl Phosphate Solution. Filed Feb. 5, 1974. Patented Mar. 9, 1976.

Patent 3,944,638. Process for Preparing Metal-Carbide-Containing Microspheres From Metal-Loaded Resin Beads. Filed June 18, 1974. Patented Mar. 16, 1976.

Patent 3,946,932. Brazing Graphite to Graphite. Filed Apr. 25, 1968. Patented Mar. 30, 1976.

Patent 3,947,335. Isotope Separation by Selective Photocisassociation of Glyoxal. Filed Mar. 4, 1975. Patented Mar. 30, 1976.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents Office of Naval Research—
Code 302, Arlington, Va. 22217

Patent 3,942,127. Aspheric Cassegrain Laser Power Amplifier System. Filed Apr. 11, 1975. Patented Mar. 2, 1976.

Patent 3,948,042. System for Controlling the Nozzle Throat Area of a Rocket Motor. Filed Dec. 23, 1968. Patented Apr. 6, 1976.

Patent 3,948,182. Semi-Active Electro-Optical Bomblet Fuze. Filed Oct. 3, 1968. Patented Apr. 6, 1976.

Patent 3,956,991. Optical, Semi-Active Bomblet Fuze. Filed Oct. 3, 1968. Patented May 18, 1976.

Patent 3,957,350. Device for Displaying a Laser Beam. Filed Aug. 26, 1974. Patented May 18, 1976.

Patent 3,964,416. Boiler Reactor. Filed July 19, 1965. Patented June 22, 1976.

Patent 3,968,400. Flash Tube Modulator. Filed Mar. 30, 1965. Patented July 6, 1976.

Patent 3,969,667. Device for Determining the State of Charge in Batteries. Filed Dec. 20, 1974. Patented July 13, 1976.

Patent 3,974,323. Metal Article Having Protective Thin Film Coating and Method of Applying. Filed Nov. 19, 1973. Patented Aug. 10, 1976.

Patent 3,978,724. Fluidic Angle-of-Attack Sensor. Filed Dec. 4, 1975. Patented Sept. 7, 1976.

Patent 3,979,253. Method for Dispersing Glass Fibers for the Preparation of Glass Filter Media. Filed Feb. 5, 1976. Patented Sept. 7, 1976.

Patent 3,979,561. Level-Code Encoded Multiplexer. Filed May 6, 1975. Patented Sept. 7, 1976.

Patent 3,982,235. Sinusoidal Film Plated Memory Wire. Filed Aug. 28, 1974. Patented Sept. 21, 1976.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters—
NASA Code GP–2, Washington, D.C. 20546

Patent 3,977,231. Static Coefficient Test Method and Apparatus. Patented Aug. 31, 1976.

Patent 3,977,771. Optical Noise Suppression Device and Method. Patented Aug. 31, 1976.

Patent 3,977,787. High Resolution Fourier Interferometer-Spectrophotopolarimeter. Patented Aug. 31, 1976.

Patent 3,978,287. Real Time Analysis of Voiced Sounds. Patented Aug. 31, 1976.

U.S. DEPARTMENT OF AGRICULTURE
Research Agreements and Patent Branch
General Service Division, Federal Building,
Agricultural Research Service
Hyattsville, Md. 20782

Patent 3,982,037. Peeling Fruits and Vegetables by Multiple Heatings and Coolings. Filed Jan. 15, 1975. Patented Sept. 21, 1976.

DEPARTMENT OF ENERGY
Assistant General Counsel for Patents
Washington, D.C. 20545

Patent 3,910,673. Coaxial Cable Connectors. Filed Sept. 18, 1973. Patented Oct. 7, 1975.

Patent 3,913,657. Method and Apparatus for Fabricating a Composite Structure Consisting of a Filamentary Material in a Metal Matrix. Filed July 17, 1974. Patented Oct. 21, 1975.

Patent 3,914,133. Thermal Battery. Filed Apr. 17, 1973. Patented Oct. 21. 1975.

Patent 3,914,392. High Temperature Insulating Carbonaceous Material. Filed Mar. 27, 1973. Patented Oct. 21, 1975.

Patent 3,914,681. Ring Magnet Firing Angle Control. Filed Nov. 6, 1974. Patented Oct. 21, 1975.

Patent 3,915,119. Apparatus for Fabricating Composite Ceramic Members. Filed May 7, 1974. Patented Oct. 28, 1975.

Patent 3,915,742. Interelectrode Separator for Electrochemical Cell. Filed May 7, 1974. Patented Oct. 28, 1975.

Patent 3,916,432. Superconductive Microstrip Exhibiting Negative Differential Resistivity. Filed May 17, 1974. Patented Oct. 28, 1975.

Patent 3,917,782. Method for Preparing Thin-Walled Ceramic Articles of Configuration. Filed May 16, 1973. Patented Nov. 4, 1975.

Patent 3,918,961. Method of Removing Bulk Sodium from Metallic Surfaces. Filed Dec. 12, 1974. Patented Nov. 11, 1975.

Patent 3,918,965. Iridium-Hafnium Alloys. Filed Apr. 26, 1974. Patented Nov. 11, 1975.

Patent 3,922,748. Reactor Vessel Seal Service Fixture. Filed May 9, 1974. Patented Dec. 2, 1975.

Patent 3,922,903. High Temperature Aqueous Stress Corrosion Testing Device. Filed Sept. 27, 1974. Patented Dec. 2, 1975.

Patent 3,923,231. Diffusion Bonding of Gold to Gold. Filed Apr. 11, 1975. Patented Dec. 2, 1975.

Patent 3,924,184. Vibrating Fiber Electrometer. Filed Sept. 16, 1974. Patented Dec. 2, 1975.

Patent 3,924,794. Solder Leveling Process. Filed Dec. 2, 1974. Patented Dec. 9, 1975.

Patent 3,928,849. Intrusion Detector Self-Test System. Filed Dec. 17, 1974. Patented Dec. 23, 1975.

Patent 3,931,520. Sample Positioning Apparatus. Filed Nov. 8, 1974. Patented Jan. 6, 1976.

Patent 3,931,522. Period Meter for Reactors. Filed Sept. 27, 1974. Patented Jan. 6, 1976.

Patent 3,931,673. Aluminum for Bonding Si—Ge Alloys to Graphite. Filed Oct. 8, 1969. Patented Jan. 13, 1976.

Patent 3,932,717. High-Explosive Driven Crowbar Switch. Filed Oct. 30, 1974. Patented Jan. 13, 1976.

Patent 3,933,447. Underground Gasification of Coal. Filed Nov. 8, 1974. Patented Jan. 20, 1976.

Patent 3,933,520. Method of Preparing Electrodes with Porous Current Collector Structures and Solid Reactants for Secondary Electrochemical Cells. Filed Apr. 3, 1975. Patented Jan. 20, 1976.

Patent 3,933,521. Anode for a Secondary, High-Temperature Electrochemical Cell. Filed Feb. 13, 1975. Patented Jan. 20, 1976.

Patent 3,933,581. Control Rod Drive for Reactor Shutdown. Filed June 4, 1974. Patented Jan. 20, 1976.

Patent 3,934,649. Method for Removal of Methane from Coalbeds. Filed July 25, 1974. Patented Jan. 27, 1976.

Patent 3,935,063. Emergency Heat Removal System for a Nuclear Reactor. Filed Nov. 28, 1973. Patented Jan. 27, 1976.

Patent 3,939,714. Variable Percentage Sampler. Filed June 10, 1975. Patented Feb. 24, 1976.

Patent 3,940,617. Method for Nondestructive Fuel Assay of Laser Fusion Targets. Filed Apr. 7, 1975. Patented Feb. 24, 1976.

Patent 3,943,014. Logic Elements for Reactor Period Meter. Filed Mar. 20, 1975. Patented Mar. 2, 1976.

Patent 3,943,458. Reducing Gain Shifts in Photomultiplier Tubes. Filed Oct. 24, 1974. Patented Mar. 9, 1976.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters
NASA Code GP–2
Washington, D.C. 20546

Patent 3,976,997. Digital Plus Analog Output Encoder. Patented Aug. 24, 1976.

Patent 3,977,147. Flanged Major Modular Assembly Jig. Patented Aug. 31, 1976.

Patent 3,977,831. Method for Detecting Pollutants. Patented Aug. 31, 1976.

Patent 3,978,178. Method of Making Hollow Elastomeric Bodies. Patented Aug. 31, 1976.

Patent 3,978,350. Dual Mode Solid State Power Switch. Patented Aug. 31, 1976.

Patent 3,978,360. III-V Photocathode With Nitrogen Doping for Increased Quantum Efficiency. Patented Aug. 31, 1976.

Patent 3,978,364. Integrated Structure Vacuum Tube. Patented Aug. 31, 1976.

Patent 3,978,410. Aircraft-Mounted Crash-Activated Transmitter Device. Patented Aug. 31, 1976.

Patent 3,978,417. Reflected-Wave Maser. Patented Aug. 31, 1976.

Patent 3,978,490. Furlable Antenna. Patented Aug. 31, 1976.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP
Washington, D.C. 20314

Patent 3,981,155. Plasma Deposited Rider Rings for Hot Displacer. Filed Mar. 10, 1975. Patented Sept. 21, 1976.

Patent 3,981,616. Hollow Composite Compressor Blade. Filed Oct. 22, 1974. Patented Sept. 21, 1976.

Patent 3,981,805. Hight Temperature Radioisotope Capsule. Filed Sept. 13, 1972. Patented Sept. 21, 1976.

Patent 3,981,811. Silicone Fluids as a Corrosion Inhibitor for Perfluorinated Polyether Fluids. Filed Jan. 14, 1976. Patented Sept. 21, 1976.

Patent 3,981,812. High Temperature Thermally Stable Greases. Filed Jan. 14, 1976. Patented Sept. 21, 1976.

Patent 3,982,101. Laser Velocimeter Real Time Digital Data Analyzer. Filed May 19, 1975. Patented Sept. 21, 1976.

Patent 3,982,130. Ultraviolet Wavelength Smoke Detector. Filed Oct. 10, 1975. Patented Sept. 21, 1976.

Patent 3,982,132. Patient Restraining Strap for Scientiphotography. Filed Feb. 13, 1975. Patented Sept. 21, 1976.

U.S. DEPARTMENT OF AGRICULTURE
Research Agreements and Patent Branch
General Service Division, Federal Building,
Agricultural Research Service
Hyattsville, Md. 20782

Patent 3,978,230. Arthropod Maturation Inhibitor. Filed Mar. 24, 1975. Patented Aug. 31, 1976.

U.S. DEPARTMENT OF ENERGY
Assistant General Counsel for Patents
Washington, D.C. 20545

Patent 3,913,326. Energy Conversion System. Filed Apr. 11, 1974. Patented Oct. 21, 1975.

Patent 3,916,686. Method for Testing Wire Rope. Filed Oct. 24, 1974. Patented Nov. 4, 1975.

Patent 3,941,612. Cathode Composition for Electrochemical Cell. Filed Mar. 4, 1975. Patented Mar. 2, 1976.

Patent 3,945,809. Method and Apparatus for Removing Coarse Unentrained Char Particles From the Second Stage of a Two-Stage Coal Gasifier. Filed July 8, 1975. Patented Mar. 23, 1976.

Patent 3,947,291. Electrochemical Cell Assembled in Discharged State. Filed Sept. 30, 1974. Patented Mar. 30, 1976.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents
Office of Naval Research
Code 302
Arlington, Va. 22217

Patent 3,971,923. Ramp Function Generator. Filed Mar. 31, 1975. Patented July 27, 1976.

Patent 3,979,803. Quick Release Latch. Filed Nov. 2, 1973. Patented Sept. 14, 1976.

Patent 3,892,058. Magnetic and Electric Field Shielding of Computer Components from Lightning. Filed May 13, 1975. Patented Sept. 21, 1976.

Patent 3,982,178. Method of Determining Adequacy of Substrate Memory Wire During the Plating Process. Filed Jan. 29, 1975. Patented Sept. 21, 1976.

Patent 3,982,189. Square Wave to Sine Wave Converter. Filed Nov. 25, 1975. Patented Sept. 21, 1976.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters
NASA Code GP–2
Washington, D.C. 20546

Patent 3,966,499. Solar Cell Grid Patterns. Patented June 29, 1976.

Patent 3,977,197. Thermal Energy Storage System. Patented Aug. 31, 1976.

U.S. DEPARTMENT OF THE ARMY
Office of Judge Advocate General, Patent Division,
Room 2C–455 Pentagon
Washington, D.C. 20314

Patent 4,028,135. Method of Cleaning Surfaces by Irradiation With Ultraviolet Light. Filed Apr. 22, 1976. Patented June 7, 1977. Not available NTIS.

Patent 4,028,623. Three Phase Spin Motor Power Meter. Filed Feb. 6, 1976. Patented June 7, 1977. Not available NTIS.

Patent 4,031,806. Internal Umbilical Connector for Missiles. Filed Sept. 1, 1976. Patented June 28, 1977. Not available NTIS.

Patent 4,033,228. Zone Setting Assembly With Temperature Compensator for Weapon Systems of the 'Soft Recoil' Type. Filed June 28, 1976. Patented July 5, 1977. Not available NTIS.

Patent 4,033,525. Feedback PDM Encoder and Method for Actuating a Pneumatic Actuator With a Digital Autopilot. Filed Dec. 8, 1975. Patented July 5, 1977. Not available NTIS.

Patent 4,033,670. Zeeman Effect Optical Isolator. Filed Mar. 3, 1976. Patented July 5, 1977. Not available NTIS.

Patent 4,033,720. Unitary Sampling and Analysis Strip and Process. Filed May 31, 1974. Patented July 5, 1977. Not available NTIS.

Patent 4,034,123. Compressed, Freeze-Dried Cottage Cheese and Method of Making. Filed Feb. 13, 1976. Patented July 5, 1977. Not available NTIS.

Patent 4,034,273. Turbo-Electric Turret Drive System for Mobile Vehicles. Filed Feb. 4, 1975. Patented July 5, 1977. Not available NTIS.

Patent 4,034,352. Phase Control of Clock and Sync Pulser. Filed Feb. 20, 1976. Patented July 5, 1977. Not available NTIS.

Patent 4,034,675. Catalysts-Containing Ablative Resonance Suppressors. Filed Aug. 20, 1970. Patented July 12, 1977. Not available NTIS.

Patent 4,035,732. High Dynamic Range Receiver Front End Mixer Requiring Low Local Oscillator Injection Power. Filed Mar. 15, 1976. Patented July 12, 1977. Not available NTIS.

Patent 4,036,012. Laser Powered Rocket Engine Using a Gasdynamic Window. Filed Feb. 18, 1976. Patented July 19, 1977. Not available NTIS.

Patent 4,036,013. Noise Controllable Nozzle Closure. Filed Dec. 22, 1975. Patented July 19, 1977. Not available NTIS.

Patent 4,037,344. Magnetic Cartridge Chambering and Bolt Holding System. Filed Mar. 22, 1976. Patented July 26, 1977. Not available NTIS.

U.S. DEPARTMENT OF AGRICULTURE
Research Agreements and Patent Branch
General Services Division, Federal Building,
Agricultural Research Service
Hyattsville, Md. 20782

Patent application 900,371. Fermentation of Liquids. Filed Apr. 26, 1978.

Patent 4,067,687. Phosphorus, Nitrogen, Bromine Containing Polymers and Process for Producing Flame Retardant Textiles. Filed Jan. 23, 1976. Patented Jan. 10, 1978. Not available NTIS.

Patent 4,070,505. Method of Imparting Paramagnetic Susceptibility to Cotton Fibers. Filed Feb. 24, 1976. Patented Jan. 24, 1978. Not available NTIS.

Patent 4,071,501. Water Soluble Adduct of Hydroxymethyl Phosphorous Compound and Ammonia or Amine Compound and Method of Preparation. Filed Jan. 14, 1976. Patented Jan. 31, 1978. Not available NTIS.

Patent 4,071,925. Apparatus for Forming Textile Lap. Filed May 25, 1976. Patented Feb. 7, 1978. Not available NTIS.

Patent 4,072,784. Fixation of Multivalent Metal Salts of Carboxyl-Containing Vinyl Monomers on Fibrous Substrates. Filed Apr. 9, 1976. Patented Feb. 7, 1978. Not available NTIS.

Patent 4,074,058. Antimicrobial Esters of Aliphatic Diols. Filed Feb. 15, 1977. Patented Feb. 14, 1978. Not available NTIS.

U.S. DEPARTMENT OF ENERGY
Assistant General Counsel for Patents
Washington, D.C. 20545

Patent application 782,874. Method of Preparing a Powdered Electrically Insulative Separator for Use in an Electrochemical Cell. Filed Mar. 30, 1977.

Patent 4,040,801. Method and Apparatus for Rapid Adjustment of Process Gas Inventory in Gaseous Diffusion Cascades. Filed Jun 14, 1976. Patented Aug. 9, 1977. Not available NTIS.

Patent 4,048,715. Method of Preparing Porous, Active Material for Use in Electrodes of Secondary Electrochemical Cells. Filed Jan. 27, 1976. Patented Sept. 20, 1977. Not available NTIS.

Patent 4,051,203. Method for Purifying Bidentate Organophosphorus Compounds. Filed July 8, 1976. Patented Sept. 27, 1977. Not available NTIS.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
National Institutes of Health, Chief, Patent Branch
Westwood Building, Bethesda, Md. 20014

Patent 4,077,957. 6-(Bromomethyl)-2,4-Diaminopteridine Hydrobromide. Filed Apr. 11, 1977. Patented Mar. 7, 1978. Not available NTIS.

Patent 4,079,056. Method of Making Pteridine Compounds. Filed Mar. 31, 1975. Patented Mar. 14, 1978. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research
Code 302
Arlington, Va. 22217

Patent 4,062,897. Acetals Derived From Negatively Substituted Aldehydes and Polynitro- or Halonitroethanols. Filed Dec. 12, 1975. Patented Dec. 13, 1977. Not available NTIS.

Patent 4,063,243. Conformal Radar Antenna. Filed May 27, 1975. Patented Dec. 13, 1977. Not available NTIS.

Patent 4,065,726. Negative Feedback Amplifier and Level Shifter. Filed Aug. 11, 1976. Patented Dec. 27, 1977. Not available NTIS.

Patent 4,066,736. Process for Producing Concentrated Solutions of Hydroxylammonium Nitrate and Hydroxylammonium Perchlorate. Filed Mar. 19, 1976. Patented Jan. 3, 1978. Not available NTIS.

Patent 4,072,123. Deep Towing Cable and Handling System. Filed Mar. 16, 1976. Patented Feb. 7, 1978. Not available NTIS.

Patent 4,075,633. Space Adaptive Coherent Sidelobe Canceller. Filed Oct. 25, 1974. Patented Feb. 21, 1978. Not available NTIS.

Patent 4,077,518. Sensor Transport System. Filed Apr. 12, 1977. Patented Mar. 7, 1978. Not available NTIS.

Patent 4,079,316. Sliding Tone Command Receiver System. Filed Sept. 13, 1976. Patented Mar. 14, 1978. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters
NASA Code GP–2
Washington, D.C. 20546

Patent application 812,447. Acoustic Driving of Rotor. Filed July 5, 1977.

Patent application 888,434. Rapid, Quantitative Determination of Bacteria in Water. Filed Mar. 20, 1978.

Patent application 891,247. Method and Apparatus for Continuous Measurement of Bacterial Content of Aqueous Samples. Filed Mar. 29, 1978.

Patent application 893,657. Method and Automated Apparatus for Detecting Coliform Organisms. Filed Apr. 4, 1978.

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The libraries listed herein, designated as patent depository libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent months or years in some libraries to all or most of the patents issued since 1870, or earlier, in other libraries.

These patent collections are open to public use and each of the patent depository libraries, in addition, offers the publications of the patent classification system (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Depending upon the library, the patents may be available in microfilm, in bound volumes of paper copies, or in some combination of both. Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the patent depository libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Birmingham Public Library	(205) 254-2555
California	Los Angeles Public Library	(213) 626-7555 Ext. 274
	Sunnyvale Patent Library*	(408) 736-0795
Colorado	Denver Public Library	(303) 573-5152 Ext. 223
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4519
Illinois	Chicago Public Library	(312) 269-2814
Massachusetts	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Detroit Public Library	(313) 833-1458
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 214
Nebraska	Lincoln: University of Nebraska-Lincoln, Love Library	(404) 472-3411
New Jersey	Newark Public Library	(201) 733-7740
New York	Albany: New York State Library	(518) 474-5125
	Buffalo and Erie County Public Library	(716) 856-7525 Ext. 267
	New York Public Library (The Research Libraries)	(212) 790-6291
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County Public Library	(513) 369-6969
	Cleveland Public Library	(216) 623-2932
	Columbus: Ohio State University Libraries	(614) 422-6286
	Toledo/Lucas County Public Library	(419) 242-7361 Ext. 258
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Pennsylvania	Philadelphia: Franklin Institute Library	(215) 448-1226
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3128
Rhode Island	Providence Public Library	(401) 521-7722 Ext. 224
Texas	Dallas Public Library	(214) 748-9071
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3043

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF AUGUST 12, 1978

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	10-12-77
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	10-17-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	11-17-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	7-6-77
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	9-19-77
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	5-2-77
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	1-28-77
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	7-11-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	1-23-78
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-17-77
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	11-24-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	7-18-77
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	5-24-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	6-2-77
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GRAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	7-8-77
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	8-24-77

Expiration of patents: The patents within the range of numbers indicated below expire during August 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,994,087 to 2,998,605, inclusive
Plant Patents..... Numbers 2,085 to 2,094, inclusive

REISSUES

SEPTEMBER 26, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,777

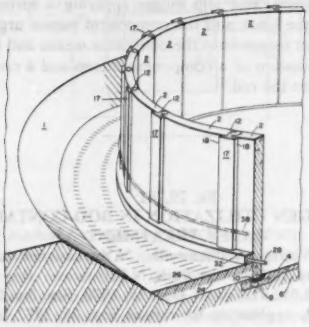
CONCRETE TANK OF PRECAST CONCRETE PANELS WITH PRETENSIONED BEAM MEANS

Francis X. Crowley, 24 Lanark Rd., Wellesley, Mass. 02181

Original No. 4,015,383, dated Apr. 5, 1977, Ser. No. 576,121, May 9, 1975. Continuation of Ser. No. 418,443, Nov. 23, 1973, abandoned. Application for reissue Jul. 22, 1977, Ser. No. 818,244

Int. Cl.[2] E04H *12/16*

U.S. Cl. 52—224 **5 Claims**



1. A tank wall comprising:

a multiplicity of precast panels concrete, laterally spaced-apart over their entire thickness, and vertically one-piece integral over the entire height of said wall,

cast concrete filler units filling the entire spaces between said panels,

a plurality of vertically spaced-apart cast continuous circular concrete beams contiguous with said panels,

said beams forming horizontal collars surrounding said wall to reinforce said wall, and

metal reinforcing means surrounding said wall and covered by the concrete of said beams,

said reinforcing means being in tension while the tank formed by said wall is empty, thereby to stress said wall.

Re. 29,778

PEDIATRIC RESPIRATOR

Jeffrey L. Stewart, Brookfield, Conn., assignor to Bio-Med Devices, Inc., Stamford, Conn.

Original No. 3,949,749, dated Apr. 13, 1976, Ser. No. 477,194, Jun. 7, 1974. Continuation-in-part of Ser. No. 445,758, Feb. 24, 1974, Pat. No. 3,910,270. Application for reissue Oct. 29, 1976, Ser. No. 736,991

Int. Cl.[2] A61M *16/00*

U.S. Cl. 128—145.8 **9 Claims**

4. A compact respirator operating in an ambient environment with a source of pressurized gas comprising

patient connection means having a patient port, an inlet port and a control port in communication with the patient port for delivering breathable gas;

means for supplying the inlet port with a flow of breathable gas at a rate selected to aid the breathing cycle from the patient port, said gas being continuously suppliable through the inlet port to the patient port and to the control port;

control valve means coupled between the control port and the ambient environment to controllably release gas from the control port for a corresponding control of gas at the patient port;

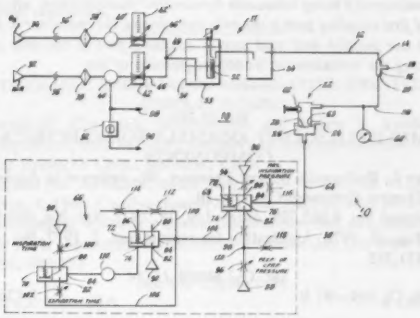
means including a pneumatically controlled bistable gas pressure controlling element operatively coupled to the control valve to control inspiratory gas flow to the patient port during one state of the bistable element and enable expiratory gas flow away from the patient port during the other state of the bistable element;

[The respirator as claimed in claim 2 wherein the means to control inspiratory and expiratory gas flow at the patient port further includes]

[means producing a source of gas under pressure;]

[a] maximum pressure control *means* operatively coupled between the [gas] source [producing means] *of pressurized gas* and the bistable gas pressure controlling element to establish a desired maximum inspiratory pressure level [at the patient port] *on said control valve means and thereby regulate inspiratory gas flow to the patient port during one state of the bistable element effectively through the bistable gas pressure controlling element*; and

[a] minimum pressure control *means* operatively coupled between the [gas] source [producing means] *of pressurized gas* and the bistable gas pressure controlling element to establish a desired expiratory pressure level [at the patient port] *on said control valve means and thereby regulate expiratory gas flow to the patient port during another state of the bistable element effectively through the bistable gas pressure controlling element;*



pneumatic oscillating means for providing cyclic gas pressures between levels selected to actuate the bistable gas pressure controlling element between its states, a first gas pressure level from the pneumatic oscillating means being selected to endure in correspondence with a desired length of time of inspiratory gas flow to the patient port and a second gas pressure level from the pneumatic oscillating means being selected to endure in correspondence with a desired length of time of the expiratory gas flow away from the patient port;

whereby the patient port may be provided with a continuous supply of breathable gas from the inlet port independent of the state of the control valve while producing inspiration and expiration respiratory support.

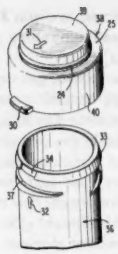
Re. 29,779
CHILD-PROOF AND PHARMACIST-ASSISTING REVERSIBLE CLOSURE FOR CONTAINERS

Glenn H. Morris, 4203 Highwood Dr., Chattanooga, Tenn. 37415

Original No. 3,865,267, dated Feb. 11, 1975, Ser. No. 426,534, Dec. 20, 1973. Application for reissue Jan. 19, 1977, Ser. No. 760,520

Int. Cl.[2] B65D *55/02, 85/56;* **A61J** *1/00*

U.S. Cl. 215—206 **20 Claims**



18. A reversible closure having two independent positions of use on a container comprising a first coupling part on said closure adapted to engage a container in one use position of the closure wherein the closure protects the interior of the container from contamination, the first coupling part separating from the container by application thereto of a simple force, and a second coupling part on the closure having positive interlocking engagment with the container in the second position of use of the closure on the container and being releasable by complex manipulation, whereby said first coupling part is the only part closing the container in said one use position and said second coupling part is the only part closing the container in the second position of use.

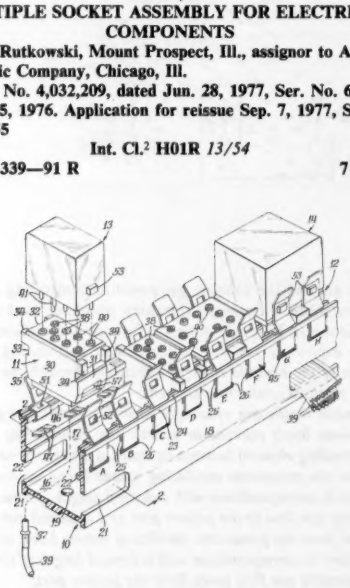
Re. 29,780
MULTIPLE SOCKET ASSEMBLY FOR ELECTRICAL COMPONENTS

John L. Rutkowski, Mount Prospect, Ill., assignor to Appleton Electric Company, Chicago, Ill.

Original No. 4,032,209, dated Jun. 28, 1977, Ser. No. 649,477, Jan. 15, 1976. Application for reissue Sep. 7, 1977, Ser. No. 831,355

Int. Cl.[2] H01R *13/54*

U.S. Cl. 339—91 R **7 Claims**



1. In an electrical apparatus comprising electrical component means, connector means having wires extending therefrom and a mounting track, said track including a pair of parallel rails defining a space therebetween, said connector means being positioned in said space and supported on said rails, said means having a plurality of mating plugs and sockets for releasably securing the component means to the connector means, the improvement comprising:

a plurality of pairs of spring clip means engaging the track, the two clip means of each pair being mounted opposite each other on respective rails and each pair defining a station, said track having the general shape of a U shaped channel having an open side and including a base between said rails opposite said open side, said rails at each station having members for supporting a connector means at said open side and at a specific location above said base whereby the wires may extend through the part of that space between the connector means and the base, said clip means and said component means having interengaging devices for releasably securing the clip means to the component means, said clip means applying a spring force between the track and the component means urging the component means onto the connector means and holding the combination of a component means and a connector means onto the rail.

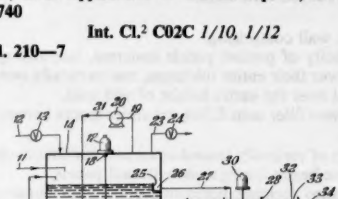
Re. 29,781
HIGH OXYGEN UTILIZATION IN BOD-CONTAINING WATER TREATMENT

John R. McWhirter, Williamsville, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Original No. 3,547,812, dated Dec. 15, 1970, Ser. No. 838,467, Jul. 2, 1969. Application for reissue Sep. 26, 1977, Ser. No. 836,740

Int. Cl.[2] C02C *1/10, 1/12*

U.S. Cl. 210—7 **10 Claims**



1. In a method for treating BOD-containing water by oxygenation in contact with active biomass, the improvement comprising: mixing BOD-containing water, biomass and feed gas comprising at least 60% oxygen (by volume) in an aeration zone *of a reactor* to form [a] *an oxygenated* liquor body and [continuing said mixing while] *a body of aeration gas isolated from the atmosphere above said liquor and continuously recirculating one of the aeration gas and liquor fluids in intimate contact with the other of said fluids in said aeration zone while venting a portion of the aeration gas to the atmosphere; and* simultaneously maintaining: (a) the oxygen feed gas to mixing plus gas-liquor contact energy ratio of 0.03–0.4 lb. moles oxygen per horsepower hour of energy supplied, (b) the aeration gas above said liquor at oxygen partial pressure of at least 300 mm. Hg but below 80% oxygen while consuming at least 50% of the feed gas oxygen in said liquor, (c) the dissolved oxygen concentration of said liquor at below 70% of saturation with respect to the oxygen in said aeration gas but above about 2 p.p.m. and [(d) continuously recirculating one of the aeration gas and liquor fluids in intimate contact with the other of said fluids in said aeration zone; and thereafter] withdrawing oxygenated liquor from said aeration zone.

Re. 29,782

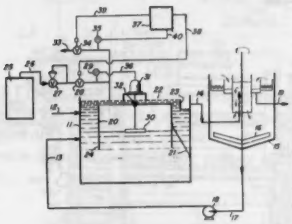
CYCLIC OXYGENATION OF BOD-CONTAINING WATER

John R. McWhirter, Williamsville, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Original No. 3,547,811, dated Dec. 15, 1970, Ser. No. 838,442, Jul. 2, 1969. Application for reissue Sep. 26, 1977, Ser. No. 836,757

Int. Cl.² C02C *1/10, 1/12*

U.S. Cl. 210—7 14 Claims



15. A method for treatment of BOD-containing water by cyclic oxygenation in contact with biomass comprising: as a first oxygenation cycle, introducing a first liquor of BOD-containing water and biomass into a chamber having a closed upper end and a lower end in fluid common with a surrounding liquid storage enclosure and substantially filling said chamber with said first liquor, introducing into said chamber a first feed gas quantity comprising at least 50% oxygen (by volume) and having oxygen partial pressure of at least 7.3 p.s.i.a. to progressively downwardly displace said first liquor from an upper level in said chamber to a lower chamber level, mixing said first feed gas and first liquor in said chamber while simultaneously continuously recirculating one of such fluids against the other fluid for at least 10 minutes and with sufficient mixing and gas-liquor contact energy input to consume at least 60% (by volume) of the oxygen in said first feed gas to form a first oxygenated liquid-solid and first unconsumed oxygen containing gas over said first oxygenated liquid-solid comprising a 10–70% oxygen but of lower oxygen purity than said first feed gas and having oxygen partial pressure of at least 1.47 p.s.i.a., exhausting said first unconsumed oxygen-containing gas from said chamber and raising a hydrostatic head of a second liquor of second BOD-containing water and second biomass into said chamber until said chamber is substantially filled with said second liquor; as a second oxygenation cycle, introducing into said chamber a second feed gas quantity comprising at least 50% oxygen (by volume) and having oxygen partial pressure of at least 7.3 p.s.i.a. to progressively downwardly displace said second liquor from an upper level in said chamber to a lower chamber level, mixing said second feed gas and second liquor in said chamber while simultaneously continuously recirculating one of such fluids against the other fluid for at least 10 minutes and with sufficient mixing and gas-liquid contact energy to consume at least 60% (by volume) of the oxygen in said second feed gas to form second oxygenated liquid-solid and second unconsumed oxygen-containing gas over said second oxygenated liquid-solid comprising 10–70% oxygen but of lower oxygen purity than said second feed gas and having oxygen partial pressure of at least 1.47 p.s.i.a., said second BOD-containing water and second biomass of said second liquor being composed at least in part of said first oxygenated liquid-solid, and exhausting said second unconsumed oxygen-containing gas from said chamber and raising a hydrostatic head of liquor of BOD-containing water and biomass in said chamber until the chamber is substantially filled with said liquor.

Re. 29,783

PROCESS FOR TREATING AQUEOUS CHEMICAL WASTE SLUDGES AND COMPOSITIONS PRODUCED THEREBY

Charles L. Smith, Conshohocken, and William C. Webster, Warminster, both of Pa., assignors to IU Technology Corporation, Miami, Fla.

Original No. 3,720,609, dated Mar. 13, 1973, Ser. No. 29,561, Apr. 17, 1970. Application for reissue Feb. 8, 1977, Ser. No. 766,796

Int. Cl.² C02C *5/02*

U.S. Cl. 210—59 19 Claims

1. The method of treating *an* aqueous chemical waste [sludges] *sludge including a sulfate compound* comprising adding to said [sludges] *sludge* sufficient lime, [aluminum-containing material] *fly ash* and water soluble sulfate compound to produce a composition having available sulfate ions, a second type of available ion selected from the group consisting of aluminum and ferric ions, the concentration of which is expressed in Al_2O_3 equivalents, and a third type of available ions selected from the group consisting of calcium and magnesium, the concentration of which is expressed in CaO equivalents, wherein the composition, including available ions in said added lime, [aluminum-containing material] *fly ash* and water soluble sulfate compounds includes at least 0.5 weight percent [$-SO_4$] ($-SO_4$)$^{-2}$, at least 0.2 weight percent Al_2O_3 and equivalents thereof, and at least 0.5 weight percent CaO and equivalents thereof, *the fly ash being present in said composition in an amount of at least 20% by weight of the amount of sludge in said composition, said composition being cementitiously hardenable through chemical reactions the products of which include calcium sulfo-aluminate hydrate or calcium alumino-sulfate hydrate, and allowing said composition to harden by chemical reaction to develop penetration resistance therein under atmospheric conditions.*

Re. 29,784

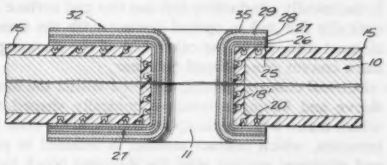
THERMAL DISSIPATING METAL CORE PRINTED CIRCUIT BOARD

Donald H. Chadwick, Northbridge, and Ruben T. Apodaca, Inglewood, both of Calif., assignors to International Electronics Research Corp., Burbank, Calif.

Original No. 3,514,538, dated May 26, 1970, Ser. No. 772,672, Nov. 1, 1968. Continuation of Ser. No. 370,792, Jun. 18, 1973, abandoned, which is a continuation of Ser. No. 131,102, Apr. 5, 1971, abandoned. Application for reissue Jun. 28, 1974, Ser. No. 483,972

Int. Cl.² H05K *1/00*

U.S. Cl. 174—68.5 8 Claims



1. A metal core printed circuit board comprising

a sheet of metal having a thickness slightly less than the thickness of a standard complete printed circuit board,

a base film of synthetic plastic resin forming a coating extending over at least one surface of said sheet, said coating having a roughened surface texture comprising a multiplicity of keying depressions,

a circuit pattern on said coating comprising conducting metallic lines,

said metallic lines comprising a base layer of nickel in keyed bonded engagement with said coating and the depresions therein, a film of copper in electroplated engagement with said nickel, an outer layer of nickel in electroplated en-

gagement with said film of copper, a layer of pyrophosphate copper in bonded engagement with said last identified layer of nickel, and an overlying layer of metal unlike said copper and nickel in adhesive engagement with said pyrophosphate copper, there being spaces between said conducting metallic lines wherein said coating is exposed and said metal core is covered by said coating.

Re. 29,785

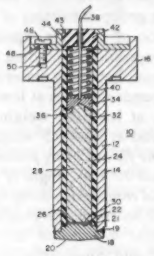
REPLACEABLE ELEMENT ULTRASONIC FLOWMETER TRANSDUCER

Walter C. Leschek, Monroeville, and James L. McShane, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Original No. 3,925,692, dated Dec. 9, 1975, Ser. No. 479,057, Jun. 13, 1974. Application for reissue Jun. 6, 1977, Ser. No. 804,119

Int. Cl.[2] H01L *41/10*

U.S. Cl. 310—327 **2 Claims**



1. An acoustic transducer assembly comprising:

an electrically conductive, generally tubular metal transducer housing;

an acoustically transmissive metal window sealingly disposed at one end of the transducer housing, with the [exterior and] interior [surfaces] *surface* of the metal window being lapped optically flat for optimum acoustic coupling;

a thin disk, piezoelectric transducer element having opposed surfaces lapped optically flat and one such surface in optical contact with the interior surface of the metal window;

an insulating sleeve disposed within the generally tubular metal transducer housing;

a generally cylindrical acoustic wave damping block disposed within the insulating sleeve, which damping block is electrically conductive and has one end surface lapped optically flat and in optical contact with the transducer element disk, while the other end of the damping block has a convex cone shaped terminus;

an electrical contact member disposed within the insulating sleeve and having a concave conically shaped surface which mates with the damping block convex cone shaped terminus, which contact member is retained in physical and electrical contact with the damping block by a coil spring means disposed within the insulating sleeve;

an insulating plate provided at one end of the insulating sleeve contacting the coil spring and having an electrical lead-in extending therethrough connected to the contact member, whereby electrical connection is made to the interior surface of the transducer element serially via the electrical contact member and the conductive damping block, with the metal transducer housing serving as another electrical lead to the other side of the transducer element via the metal window;

a closure member closing the tubular transducer housing and connectable thereto about the insulating plate and contacting the insulating plate to thereby compress the coil spring to compress together the contact member, the damping block, and the transducer element to the metal window.

Re. 29,786

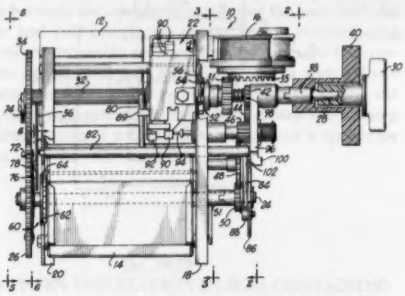
COMBINED 82-POSITION UHF AND VHF TELEVISION TUNER WITH MEMORY FINE TUNING

Morton L. Weigel, Bloomington, Ind., assignor to Sarkes Tarzian, Inc., Bloomington, Ind.

Original No. 3,973,229, dated Aug. 3, 1976, Ser. No. 537,841, Jan. 2, 1975. Application for reissue Feb. 14, 1977, Ser. No. 768,102

Int. Cl.[2] H03J *1/02, 3/12*

U.S. Cl. 334—86 **23 Claims**



15. A combination UHF and VHF television tuning system comprising:

a VHF television tuner tunable to each of the television channels in the VHF television band;

a UHF television tuner having a continuously variable tuning shaft, rotation of said tuning shaft being effective to tune said UHF tuner over the entire UHF television band;

a single selector shaft coupled to said UHF and VHF television tuners, rotation of said selector shaft being effective to tune said television tuners to all of the UHF and VHF television channels in the UHF and VHF television bands, said selector shaft including detent means for rendering said selector shaft incrementally rotatable over a predetermined number of detent positions for selecting each of the channels in the UHF and VHF television bands, each of said detent positions uniquely corresponding to one of said UHF and VHF channels; and

means for providing a unique indication of the channel number corresponding to each detent position of said selector shaft.

Re. 29,787

COLOR PHASE MATCHING SYSTEM FOR MAGNETIC VIDEO TAPE RECORDINGS

David W. Bargen, Pleasanton, Calif., assignor to Orrox Corporation, Santa Clara, Calif.

Original No. 3,890,638, dated Jun. 17, 1975, Ser. No. 390,577, Aug. 22, 1973. Application for reissue Feb. 7, 1977, Ser. No. 765,949

Int. Cl.[2] H04N *5/78*

U.S. Cl. 358—4 **16 Claims**

1. A color frame system for use with a video tape recorder/-reproducer for providing color burst phase matching comprising:

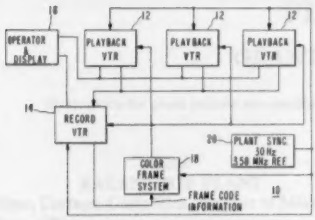
a. means for *sequentially* identifying [alternate frames] *each individual frame* of video recorded on the recording tape;

b. means for detecting the [alternate-] *sequential individual* frame identifications to generate alternate-frame identification signals *from the sequential individual frame identifications* to distinguish alternate frames recorded on the tape;

c. means synchronized with a stable signal source for generating frame reference signals at a frequency to provide

means for distinguishing alternate video frames in time relative to said stable signal source;

d. means for comparing said alternate-frame identification signals and said frame reference signals; and



e. means [responsive] *responsive* to said comparison means to control the tape speed and/or position for correcting the recording tape frame position relative to said frame reference signal if required for proper color burst phase match.

Re. 29,788

INVERTER HAVING FORCED TURN-OFF

Thomas E. Anderson, Normal, Ill., and John P. Walden, Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Original No. 3,953,780, dated Apr. 27, 1976, Ser. No. 516,772, Oct. 21, 1974. Application for reissue Feb. 1, 1977, Ser. No. 764,695

Int. Cl.[2] H02M *7/537*

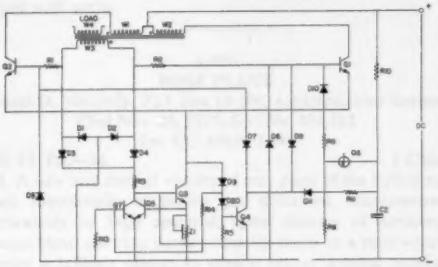
U.S. Cl. 363—97 **30 Claims**

1. An electrical inverter circuit for converting a d.c. electrical input into an a.c. electrical output, said inverter circuit comprising:

a transformer structure having secondary winding means for supplying said electrical output and a primary winding means, said winding means being magnetically coupled to each other through magnetic circuit means,

active element switch means electrically connected to said primary winding means and electrically connectable to said d.c. electrical input for alternately switching said d.c. electrical input to said primary winding means for producing corresponding varying magnetic fields in said magnetic circuit means and thereby producing said a.c. electrical output in said secondary winding means, and

electrical control means electrically connected to said active element switch means for monitoring the magnitude of electrical current flowing in said primary winding means and controlling said alternate switching operation in response to the detection of current in said primary winding in excess of a predetermined level,



said electrical control means including a further controllable active element means in circuit with said active element switch means such that the primary winding current also flows therethrough and synchronous control means for synchronously controlling said further active element means so as to increase the electrical impedance thereof during at least a portion of each switching transition of said active element switch means.

PLANT PATENTS

GRANTED SEPTEMBER 26, 1978

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,306

KALANCHOE PLANT

Claude Hope, Cartago, Costa Rica, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Aug. 11, 1977, Ser. No. 823,851
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of kalanchoe known by the cultivar name Adagio and characterized particularly as to uniqueness by the combined characteristics of intense red purple flower color; excellent keeping qualities of the flowers; large floral display; small compact foliage; profuse self-branching; rapid rooting habit, and by the characteristic of being ideally suited for either normal or miniature flowering.

4,307

KALANCHOE PLANT

Claude Hope, Cartago, Costa Rica, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Aug. 11, 1977, Ser. No. 823,852
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of kalanchoe plant known by the cultivar name of Rhumba and particularly characterized as to uniqueness by the combined characteristics of clear orange red flower color, with the throat being light orange; massive inflorescence, having substantial depth of flowering; excellent keeping qualities for both flowers and foliage; relatively thin but stiff, wiry flower stems; long, elliptical, double crenate foliage, excellent branching habit, and by its early, uniform flowering.

4,308

VIOLET PLANT NAMED VERA

Arnold W. Fischer, Fallbrook, Calif., assignor to Geo. J. Ball, Inc., West Chicago, Ill.

Filed Sep. 30, 1977, Ser. No. 839,285
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—69 **1 Claim**

1. A new and distinct variety of African violet plant substantially as herein shown and described, characterized by its purple-violet flowers, most petals of which are delicately edged with white.

4,309

ROSE PLANT

Samuel D. McGredy, P.O. Box 14-100, Auckland, New Zealand

Filed Nov. 25, 1977, Ser. No. 854,512
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—16 **1 Claim**

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as shown and described, characterized particularly by high centered, spiral flowers of persistent orange blend coloring borne primarily singly to a stem which display a brilliant orange to salmon orange general tonality upon aging and are long lasting on the plant and as cut flowers grown on a very vigorous upright growing, free branching plant with large abundant foliage.

4,310

POINSETTIA

Cleveland Ott, 677 Grater Ave., Graterford, Pa. 19426

Filed Oct. 14, 1976, Ser. No. 732,369
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—86 **1 Claim**

1. A new and distinct variety of poinsettia plant, substantially as herein illustrated and described, characterized particularly as to novelty by a color which is bright red but a darker red than its parent, Annette Hegg Supreme (U.S. Plant Pat. No. 3,392), its grandparent, Annette Hegg (U.S. Plant Pat. No. 2,962), and related sports which have evolved directly or indirectly from said grandparent, bracts which are between 10 and 40% wider than in the parent Annette Hegg Supreme, thereby providing less open space between bracts, a plant which is approximately 10–20 percent shorter and is more compact than its parent, Annette Hegg Supreme, its grandparent, Annette Hegg, and sports thereof, a plant which grows more uniformly than does the parent, Annette Hegg Supreme, a plant which blooms 3–5 days earlier than its parent and its grandparent, and a plant which has good leaf and bract retentions equal to that of the parent.

PATENTS

GRANTED SEP. 26, 1978

ERRATA

For CLASS	See PATENT NO.
229-048 R	4,115,909
035-055	4,115,937
527-073	4,115,973
535-070	4,115,978
535-034	4,115,982
405-066	4,116,007
405-119	4,116,008
114-264	4,116,009
405-262	4,116,010
405-134	4,116,011
405-238	4,116,012
405-216	4,116,013
405-179	4,116,014
405-169	4,116,015
084-267	4,116,107
084-330	4,116,108
118-648	4,116,141
136-089 H	4,116,207
126-271	4,116,219
126-271	4,116,220
126-271	4,116,221
126-271	4,116,222
126-271	4,116,223
126-271	4,116,224
126-271	4,116,225
126-299 D	4,116,226
128-002	4,116,227
128-002 R	4,116,228
128-002 V	4,116,229
128-002.5 M	4,116,230
128-002.1 Z	4,116,231
128-020	4,116,232
128-032	4,116,233
123-032 SP	4,116,234
128-069	4,116,235
128-080 C	4,116,236
128-142.7	4,116,237
128-172.1	4,116,238
128-184	4,116,239
128-218 M	4,116,240
128-260	4,116,241
209-570	4,116,435
417-286	4,116,577
427-154	4,116,628
422-013	4,116,629
422-024	4,116,630
422-101	4,116,636

422–063	4,116,637
422–099	4,116,638
422–111	4,116,639
422–264	4,116,640
422–246	4,116,641
422–249	4,116,642
062–059	4,116,651
062–534	4,116,652
096–111	4,116,700
195–029	4,116,786
528–088	4,116,886
528–020	4,116,887
521–031	4,116,888
521–027	4,116,889
521–028	4,116,890
521–089	4,116,891
521–137	4,116,893
521–094	4,116,894
528–220	4,116,923
528–034	4,116,935
526–286	4,116,936
528–170	4,116,937
528–093	4,116,938
528–215	4,116,939
528–173	4,116,940
528–283	4,116,942
528–292	4,116,943
528–366	4,116,944
528–362	4,116,945
528–172	4,116,946
528–388	4,116,947
544–325	4,116,958
544–284	4,116,959
544–366	4,116,960
568–726	4,117,018
310–320	4,117,074
521–060	4,117,178

PATENTS

GRANTED SEPTEMBER 26, 1978

GENERAL AND MECHANICAL

4,115,873

HIGHLY STRETCHABLE GLOVE AND METHOD OF SIZING SAME

Benjamin Stansbury, Beverly Hills, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed Oct. 31, 1977, Ser. No. 846,928

Int. Cl.[2] A41D *19/00*

U.S. Cl. 2—163 **15 Claims**

1. A series of highly stretchable gloves of different sizes, the series consisting of gloves with incremental differences in the lengths of the glove hand portion that are smaller than the incremental differences in the circumferences of the glove hand portion, whereby a reduced number of gloves are needed to properly fit a wide variety of hand shapes.

4,115,874

HELMET FOR USE IN RIDING VEHICLES

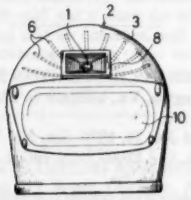
Masahiro Hasegawa, 1-11-12, Nishiazabu, Minato-ku, Tokyo, Japan

Filed Sep. 15, 1977, Ser. No. 833,413

Claims priority, application Japan, Feb. 21, 1977, 52-19992[U]; Apr. 7, 1977, 52-42587[U]; May 30, 1977, 52-70501[U]

Int. Cl.[2] A42B *3/02*

U.S. Cl. 2—425 **3 Claims**



1. A helmet for use in riding vehicles such as motorcycles and motorbikes comprising:

a cap like body formed of hard and solid material;

a bumping body applied on an inner surface of the cap like body; and

a plurality of uninterrupted streamline recesses formed in an outer surface of the bumping body and extending completely from a forehead edge portion to a backhead edge portion of the helmet.

4,115,875

HIP PROSTHESIS

Andre Rambert, 27, avenue Lacassagne, Lyon, 3eme, Rhone; Gilles Bousquet, 19, avenue Beranger, Ecully, Rhone, and Henri Dejour, 21, rue des Deux Fermes, Bron, Rhone, all of France

Filed Apr. 19, 1977, Ser. No. 788,827

Claims priority, application France, Apr. 26, 1976, 76 13189

Int. Cl.[2] A61F *1/24*

U.S. Cl. 3—1.913 **2 Claims**

1. Prosthesis of the male-female ball-and-socket type comprising:

a base of the male element composed of a plate designed to bear on the upper sectioned end of the femur, the bearing face of said plate having a rod designed to engage the femur end,

an active organ comprising a sphere provided with a radial projection having a smooth part followed by a terminal threaded zone, said smooth part of said radial projection of said active organ having a conical shape with a slight taper toward the free end thereof, the face opposite said bearing face of the base having a threaded bore able to receive the threaded end of said radial projection of said active organ, and a conical bearing surface above said threaded bore with a shape matching said smooth part of said radial projection of said active organ, and

means for allowing said active organ to rotate and preventing said base from rotating, said means being provided to facilitate assembly of said active organ on said base and removing said active organ.

4,115,876

SELF-CONTAINED RECIRCULATING TOILET SYSTEM

William Cole, Jr., Oakland, and William R. Preis, River Edge, both of N.J., assignors to Cole Resdevel Corp., Fairlawn, N.J.

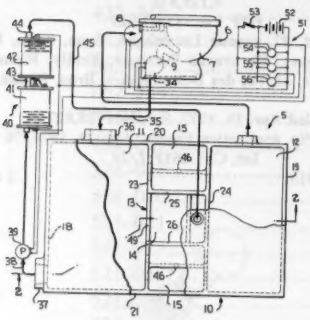
Filed Nov. 24, 1976, Ser. No. 744,873

Int. Cl.[2] E03D *5/016*

U.S. Cl. 4—317 **11 Claims**

1. A self-contained recirculation waste system comprising a disposal unit of the type including a flush system having an inlet and a discharge system having an outlet, a holding tank unit, a sterilization cell unit, said holding tank unit including a flush water compartment and a raw waste compartment; and plumbing means coupling said discharge system outlet to said raw waste compartment, said raw waste compartment to said cell unit, said cell unit to said flush water compartment, and

said flush water compartment to said flush system inlet, said holding tank unit including a flotation separation compartment



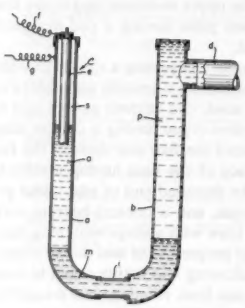
coupled between said cell unit and said flush water compartment.

4,115,877

LIQUID LEVEL SENSING DEVICE AND SWIMMING POOL WATER CIRCULATION SYSTEMS CONTAINING THE SAME

Frederick Wall, 707 Belleview Rd., Rock Hill, S.C. 29730

Filed Mar. 24, 1977, Ser. No. 780,742
Int. Cl.[2] E04H *3/16*; G01F *23/10*
U.S. Cl. 4—172.17 **26 Claims**



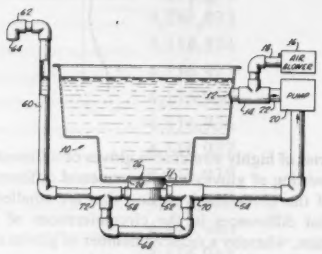
1. A liquid level sensing and control device comprising, in combination, a U-tube having substantially vertical legs connected by another member putting the legs in fluid flow intercommunication at their lower ends; a variable capacitor in one leg of the U-tube, comprising two spaced electrodes; a first mobile body in said one leg of a first dielectric liquid capable of rising and falling within the space between the electrodes and to a level at which it partially or fully fills the space; a second mobile body in said one leg of a second liquid having a higher density than and immiscible with the dielectric liquid and having an upper surface on which rests the first body of dielectric liquid; a third mobile body in the second leg of a third liquid immiscible with the second liquid and disposed in operative relationship with the second body of liquid; and a fluid line connection putting said third body of liquid into contact with a fourth body of the same or different liquid whose liquid level is to be sensed, the third body moving in the U-tube to a changed position in response to change in hydrostatic fluid pressure communicated from the fourth body to said third body as a function of fluid level of the fourth body so that the relative level of said first body of first liquid in the space between the electrodes in the variable capacitor is related to liquid level in said fourth body, communicated as fluid pressure via the fluid pressure communication to said third body, the third body thereby moving the second body of liquid and the second body of liquid moving the first body of liquid in the U-tube to a level related to liquid level in said fourth body, and corresponding to a capacitance of the variable capacitor; and means sensing at least one selected capacitance of the variable capacitor and initiating a control reaction responsive thereto.

4,115,878

SPA SAFETY DRAIN

Lawrence E. Johnson, Dana Point; William W. Conger, IV, Santa Ana, and Gerald W. Moreland, Garden Grove, all of Calif., assignors to South Pacific Industries, Santa Ana, Calif.

Filed Mar. 14, 1977, Ser. No. 777,034
Int. Cl.[2] E04H *3/19*; A61H *9/00, 33/02*
U.S. Cl. 4—172.17 **10 Claims**



1. In a spa including a shell with a water inlet, a drain completely submerged at the bottom of said shell, a recirculating water pump having a suction line connected to the drain and a pressure line connected to the inlet, the improvement comprising

safety apparatus for decreasing suction forces exerted upon an object or person that may inadvertently block flow of water into the drain, to thereby avoid entrapment of such object or person at the drain, said apparatus comprising a vent conduit having an end at the bottom of said shell connected with said drain and having an intake open to atmosphere and positioned above water level of said shell, said vent conduit extending externally of said shell and upwardly from said drain and the bottom of said shell to said intake; a drain by-pass conduit connected to and between said pump suction line and said vent conduit, whereby blockage of said vent conduit within said drain will not disable operation of said vent conduit to avoid entrapment.

4,115,879

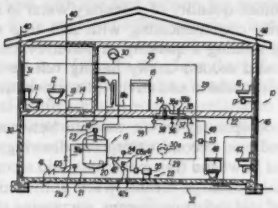
WATER RECIRCULATION SYSTEM

Ed P. Toms, Arlington, Va., assignor to The Water-Cyk Corporation, Vienna, Va.

Filed Jul. 21, 1976, Ser. No. 707,340
Int. Cl.[2] E03D *1/26*; B01D *21/10*
U.S. Cl. 4—318 **11 Claims**

1. A water conservation system comprising: means distributing clean water to selected household facilities for use therein; drain means in said selected facilities other than facilities which have as their primary function the disposal of human waste for delivering said water from said selected facilities to a settling tank at a level below said facilities for the gravitational separation of solids therefrom; water pump means associated with said settling tank, said pump having conduit means for receiving water from said tank and delivering pressurized water to a storage receptacle at a pressure level above that of said facilities, water purification means adapted to destroy microorganisms therein which is associated with said settling tank for

treating all water delivered from said drain means passing through said settling tank; and other household facilities associated with said storage receptacle for drawing water therefrom, as required.

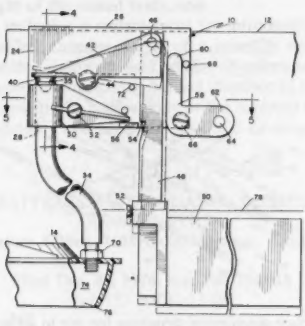


4,115,880

FLUSH VALVE CONTROL ASSEMBLY

Henry William Gruenhagen, 2030 Ebers, San Diego, Calif. 92107

Filed Aug. 15, 1977, Ser. No. 824,528
Int. Cl.[2] E03D *1/34, 1/14, 3/12*
U.S. Cl. 4—325 **9 Claims**



1. Vent control assembly for a flapper type flush valve comprising:

a valve body having a bore,

tubular means connected to said valve body for communicating said bore with the air chamber of a flush valve,

a valve member mounted on said body and comprising a rocker arm having a valve plug on one end for engaging said valve bore and selectively movable into and out of engagement with said valve bore for either selectively closing or venting said air chamber, and

a float assembly connected to the other end of said rocker arm and responsive to the level of water acting thereon for controlling said valve member.

4,115,881

TOILET FLUSHING ASSEMBLY

Andrew Joseph Stone, 457 Beach 124th St., New York, N.Y. 11694

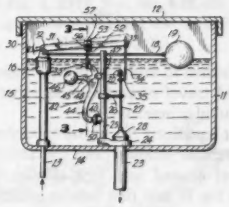
Filed Jul. 25, 1977, Ser. No. 818,637
Int. Cl.[2] E03D *1/14*
U.S. Cl. 4—326 **2 Claims**

1. In a toilet flushing assembly of the type including a water tank, a water discharge pipe disposed at least partially within the tank and having an opening at the upper end thereof defining a primary flush valve seat, a flush valve ball, means for moving the flush valve ball between an open and closed position relative to the primary flush valve seat to respectively permit the discharge from and the containment of the water introduced into the tank, and a generally upstanding overflow pipe disposed within the tank and having a lower open end which communicates with the discharge pipe, the improvement, comprising:

said overflow pipe having an opening therein disposed at a level above said primary valve seat which opening defines a secondary flush valve seat;

a movable valve member disposed within said tank for effecting sealing engagement with said secondary valve seat; and

means for moving said valve member between an open and closed position relative to said secondary flush valve seat, so as to permit in said open position thereof, a partial discharge of the water held in said tank through said overflow pipe and, in turn, said discharge pipe, while said flush valve ball remains in a closed position relative to said primary valve seat, said means for moving said valve member includes a float member, a pivotable rocker arm pivotably mounted on said overflow pipe by a mounting bracket and pin and having a first leg extending generally axially to which said float member is rigidly secured at the end of said first end remote from said bracket and pin and a second leg, disposed beneath said first leg, to which said



valve member is secured and means for pivoting said rocker arm in a first direction to permit movement of said valve member from said closed to said open position thereof, so as to permit partial discharge of water contained in said tank, said float member being lowered as the water level drops and causing pivotable movement of said rocker arm in a second direction opposite to that of said first direction to, in turn, cause movement of said valve member from said open to said closed position thereof; and wherein said rocker arm includes a third leg and wherein said means for pivoting said rocker arm includes a pivotable handle mounted externally on said tank, an elongated trip arm generally horizontally disposed within the tank, one end of which is coupled to said handle to permit pivotable movement of said trip arm about said inner end thereof, and an elongated, generally vertically disposed trip hook secured to said trip arm, having a lower depending end which engages said third leg of said rocker arm; and wherein said rocker arm has a generally S-shaped configuration, the upper and lower ends of which define, respectively, said third and second legs thereof, with said first leg disposed between said upper and lower ends thereof.

4,115,882

FLUSH VALVE FOR TOILET TANKS

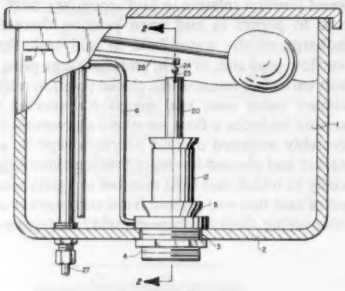
Paul Paulus, 3394 Paris Blvd., Westerville, Ohio 43081

Filed Mar. 31, 1977, Ser. No. 783,148
Int. Cl.[2] E03D *1/14*
U.S. Cl. 4—327 **9 Claims**

1. A flush valve for use in a toilet flush tank having a trip lever and a drain opening from said tank comprising:

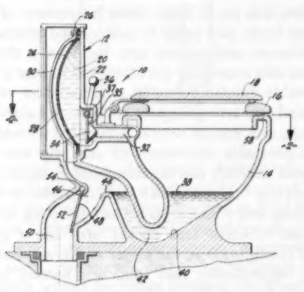
(a) a first vertically movable tubular member, open at each end, having a longitudinal bore therethrough and adapted at one end to seat and seal against a valve head;

(b) a first valve head fixed on the other end of said first tubular member and adapted to seal against the drain opening in said tank;
(c) a guide engaging said first tubular member and adapted to guide it vertically;
(d) a second valve head adapted to seal against said one end of said first tubular member;
(e) means for attaching said second valve head to said trip lever;



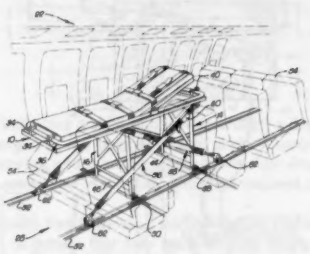
(f) means attached to said first tubular member for arresting the upward travel of said second valve head relative to said first tubular member; and
(g) means for equalizing the pressure between the interior of said first tubular member and the atmosphere when the water level around said first tubular member subsides below the top of said first tubular member.

4,115,883
DIAPHRAGM ACTIVATED TOILET
Hector A. Dauvergne, P.O. Box 884, San Leandro, Calif. 94577
Filed May 31, 1977, Ser. No. 801,521
Int. Cl.[2] E03D *3/10*
U.S. Cl. 4—353 **4 Claims**



1. A water saving toilet device comprising:
a bowl constructed to hold a quantity of sedentary water and waste;
a first cavity having a flexible diaphragm wherein said flexible diaphragm divides said first cavity into a water storage chamber having a variable volume on one side of said diaphragm and an air chamber having a variable volume on the other side of said chamber;
means for deforming said diaphragm, increasing the volume of the water storage chamber and diminishing the volume of the air chamber;
discharge means communicating with said water storage chamber for initiating a discharge of a stored quantity of water from said storage means to said bowl when said discharge means is activated;
a trap means communicating with said bowl for maintaining a predetermined quantity of sedentary water in said bowl;
a second cavity communicating with said trap means for temporarily holding a quantity of water evacuated from said bowl, said second cavity having release means for releasing water held in said cavity to a conventional sewer line; and,
draw means comprising an air passage between said air chamber and said second cavity for drawing sedentary water in said bowl and trap means into said second cavity; wherein said discharge means, when activated, reverses the action of said deforming means, decreasing the volume of the water storage chamber and increasing the volume of the air chamber, generating a partial vacuum in said second cavity.

4,115,884
STRETCHER SUPPORTING STRUCTURE FOR AIRPLANES, OR THE LIKE
Marvin J. Keogh, North Hollywood, Calif., assignor to Air Medic, Inc., North Hollywood, Calif.
Filed Sep. 28, 1977, Ser. No. 837,587
Int. Cl.[2] A47B *83/04*
U.S. Cl. 5—82 R **6 Claims**



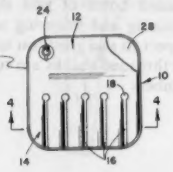
1. A stretcher supporting structure for use in an airplane, or other vehicle, including:
(a) an elongated stretcher supporting frame adapted to be positioned generally horizontally;
(b) hook means adjacent one end of said frame facing longitudinally of said frame toward the other end thereof and adapted to receive one end of the stretcher;
(c) upwardly facing hook means adjacent said other end of said frame and adapted to receive the other end of the stretcher; and
(d) means for securing the other end of the stretcher in said upwardly facing hook means.

4,115,885
WATER CUSHION AND METHOD OF USING THE SAME
Charles E. Davis, 714 N. Lazard, San Fernando, Calif. 91340
Filed Aug. 29, 1977, Ser. No. 828,527
Int. Cl.[2] A47C *27/08*
U.S. Cl. 5—349 **1 Claim**

1. A cushion particularly suited for use in supporting a human body in a seated disposition comprising:
a sealed envelope formed of a pair of similarly configured flexible sheets disposed in superimposed registry and having an endless seam extended about the periphery thereof, said envelope being characterized by a first section extended transversely across said envelope for receiving in supporting relation the buttocks of a seated human body and having defined therein a water-filled, unbaffled chamber from which the water is expelled in response to the

weight of a seated human body, and a second section of a thickness slightly less than the thickness of the first section extended transversely across the envelope in juxtaposed parallelism with the first section for receiving water expelled from said unbaffled chamber including support means for supporting the second section against deformation about axes lying in the plane thereof comprising,

an array of at least six tubular chambers of uniform cylindrical configurations normally related to the first chamber and extended in juxtaposed parallelism, each having an open end communication with said first chamber for



receiving water expelled therefrom and a sealed end opposite said open end for confining the expelled water under pressure, whereby the tubular chambers are adapted to become substantially rigid in response to the weight of the seated body, and

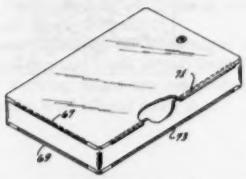
means including a sealable port for introducing into said unbaffled chamber water of a quantity sufficient for imparting rigidity to said tubular chambers as the water is expelled from said unbaffled chamber in response to the weight of a human body as the buttocks thereof are received by said first section of said envelope.

4,115,886

FLUID MATTRESS WITH SQUARED GUSSET PANEL CONSTRUCTION

Craig Salvatore Miller, 7688 Calla Durango, Anaheim, Calif. 92803

Filed Dec. 23, 1976, Ser. No. 754,015
Int. Cl.[2] A47C *27/08*
U.S. Cl. 5—365 **13 Claims**



1. A mattress having characteristics for being filled with a liquid, comprising:

a first sheet of material having a first marginal portion extending around the periphery of the first sheet and having a generally planar configuration when the mattress is filled with the fluid;

a second sheet of material having a second marginal portion extending around the periphery of the second sheet and having a generally planar configuration when the mattress is filled with the fluid;

the first sheet having generally the shape of a rectangle, the rectangle having four substantially straight sides and four corners, a particular one of the corners having the configuration of a curve with a radius not greater than three inches;

a side panel extending around the periphery of the mattress and having a third marginal portion and a fourth marginal portion extending between first and second ends of the side panel;

means for connecting the third marginal portion of the side panel to the first marginal portion of the first sheet to form a first seal extending around the periphery of the mattress;

the side panel at the particular corner of the first sheet having the configuration of a curved surface when the mattress is filled with the fluid and the curved surface having a radius not greater than about 3 inches;

means for connecting the fourth marginal portion of the side panel to the second marginal portion of the second sheet to form a second seal extending around the periphery of the mattress;

means for connection the first end of the side panel to the second end of the side panel to form a fluid-tight cavity between the first sheet, the second sheet and the side panel; and

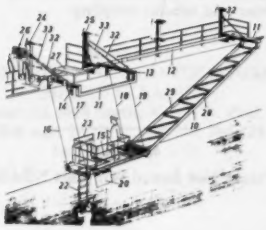
means for providing access to the cavity to provide for the filling of the mattress with the fluid.

4,115,887

SHIP'S EMBARKATION DEVICE FOR E.G. PILOTS

Gunnar Ewards, Askim, Sweden, assignor to AB Welin, Askim, Sweden

Filed Jul. 1, 1977, Ser. No. 812,408
Claims priority, application Sweden, Jul. 6, 1976, 7607699
Int. Cl.[2] E04G *3/00*
U.S. Cl. 9—1.6 **8 Claims**



1. In a ship's embarkation device for e.g. pilots comprising a projecting means extending substantially parallel to the ship's side, said projecting means at one of its ends being pivotally mounted in the vertical plane and unrotatably connected in the horizontal plane to a bracket mounted at the ship's deck, at the opposite end of the projecting means a platform being pivotally mounted, said platform by means of a wire arrangement being supported by two davit arms, said davit arms by means of an axle extending in the longitudinal direction of the ship being unrotatably connected to said bracket, the improvement wherein the embarkation device is provided with at least one means, which in relation to the ship's side is placed outside a central longitudinal plane through the embarkation device for giving said device a component force directed towards the ship's side, said force being stronger than the force striving to swing the device out from the ship's side when the ship heels moderately (10°–13°).

4,115,888

POOL FLOAT PROPELLING APPARATUS

George K. Sievers, 1110 Kenwood St., Burbank, Calif. 91505

Filed Jun. 30, 1977, Ser. No. 811,486
Int. Cl.[2] B63C *9/30*
U.S. Cl. 9—347 **12 Claims**

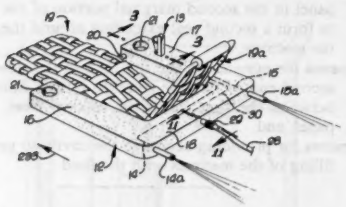
1. In combination with a forwardly longitudinally oriented carrier float adapted to be propelled while floating in a pool of water, comprising

(a) manual control means on the carrier float,

(b) propellant fluid ducting on the float and having outlet

means to be submerged in the pool, said fluid outlet means including two fluid jet outlets which are laterally spaced apart and from which propellant fluid may escape in jets at controllable rates, both outlets remaining fixed relative to the float and directed generally rearwardly relative to a forward propulsion direction of the float,

(c) and other control means on the carrier float responsive to selective movement of said manual control means to variably control the escape of propellant fluid from said two



outlets thereby to control the direction of propulsion of the float in the pool,

(d) said other control means including valve means coupled to said manual control means, one portion of said ducting extending from said valve means to said outlets,

(e) there being a tubular coupling on the carrier float exposed for connection to a flexible line to supply propulsion fluid under pressure to said outlets via said ducting, another portion of said ducting extending to said valve means from said tubular coupling.

4,115,889

Patent Not Issued For This Number

4,115,890

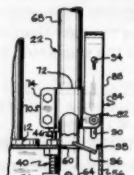
HIGH-SPEED POLISHING MACHINE

Jack L. Burgoon, Toledo, Ohio, assignor to The Scott & Fetzer Company, Lakewood, Ohio

Filed Apr. 25, 1977, Ser. No. 790,396

Int. Cl.[2] A47L *11/162*

U.S. Cl. 15—49 R **5 Claims**



1. A polishing machine comprising a platform, wheels at a rear portion of said platform for supporting the platform above the floor, a housing at a forward portion of said platform, a rotatable pad driver rotatably supported by said housing, a motor mounted on an intermediate portion of said platform between said housing and said wheels for rotating said driver, a handle pivotally mounted on a rear portion of said machine, said wheels having an axle extending transversely of said machine under said platform, at least two spaced adjusting members under said platform and having transverse holes receiving said axle, said members having threaded bores therein, threaded shanks received in said bores, said threaded shanks having smaller threaded bores, and bolt means extending through openings in said platform and threadedly engaged in said smaller threaded bores of said threaded shanks, said threaded shanks raising and lowering said spaced adjusting members with respect to said platform to raise and lower said wheels when said threaded shanks are turned into and out of said adjusting members.

4,115,891

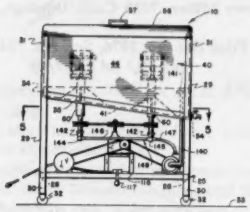
CLEANING APPARATUS

Robert N. Wills, 5942 E. Hamilton Ave., Fresno, Calif. 93727

Filed Jan. 6, 1977, Ser. No. 757,203

Int. Cl.[2] A46B *13/04*

U.S. Cl. 15—71 **7 Claims**



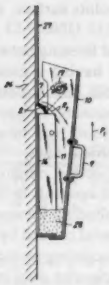
5. An apparatus for cleaning a container having a substantially cylindrical side wall with an exterior surface, an interior surface bearing paint, lacquer or the like, a bottom wall and an annular lip bounding an opening remote from the bottom wall, the apparatus comprising a brush having a longitudinal axis and dimensioned to be received in the container extending substantially between the bottom wall and the lip and in engagement with the interior surface of the side wall at the time of insertion; means for rotating the brush about its longitudinal axis; more than two elongated members borne by the apparatus substantially equally spaced from each other to receive said container between the members when the brush is received in the container; means for urging said members toward the longitudinal axis of the brush and into engagement with the exterior surface of the side wall extending more than half the distance between the bottom wall to the lip to mount said container in fixed position in axial alignment with the longitudinal axis of the brush; and means for supplying a solvent to the interior surface of the container.

4,115,892

SCRAPING TOOL

Heinz Stickler, Bahnstrasse 258, A-2551 Enzesfeld, Austria

Filed Jun. 28, 1977, Ser. No. 810,751
Int. Cl.[2] A47L *13/08*
U.S. Cl. 15—105 14 Claims



9. A scraping tool comprising:

an elongate body with a pair of sidewalls and a foreshortened wall perpendicular thereto, said foreshortened wall forming a flat guide face slidable along a surface to be scraped, said sidewalls having extensions set back from said guide face and projecting beyond a transverse boundary of said foreshortened wall to form a clearance between said body and the surface contacted by said guide face, said sidewalls further having longitudinal edges which are substantially parallel to said guide face;

a blade in said clearance having a pair of shanks which bracket said sidewalls and are pivotally secured to said extensions with freedom to turn about a transverse swing axis parallel to said boundary, said blade having a pair of working edges parallel to said swing axis positioned for alternate engagement with the contacted surface upon sliding of said body thereover in opposite directions, said blade being outwardly concave about an axis of curvature parallel to said swing axis; and

abutment means including said longitudinal edges on said body for arresting said blade in two limiting positions in which said working edges are respectively located at substantially the level of said guide face.

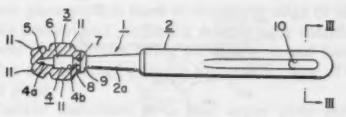
4,115,893

GUM BRUSH FOR INFANTS

Yuichi Nakata, Chigasaki, and Tadayoshi Murakami, Tokyo, both of Japan, assignors to Pigeon Kabushiki Kaisha, Tokyo, Japan

Filed May 4, 1977, Ser. No. 793,803
Claims priority, application Japan, Jul. 7, 1976, 51-89907
Int. Cl.[2] A46B *9/04*
U.S. Cl. 15—110 3 Claims

1. A gum brush for infants comprising an elongated handle with a forward stem end, a brush head made of a rubberlike material and secured onto said stem end, and a plurality of projections made of a rubber-like material and integrally joined to and projecting outward from the outer surface of said brush head, said projecting comprising first fin-like projections and second fin-like projections aligned in directions intersecting



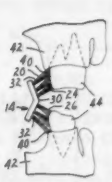
the directions of said first fin-like projections, all projections projecting radially outward from said brush head, and said first and second fin-like projections being mutually interspersed in symmetrical and distributed arrangement around the surface of the brush head.

4,115,894

TOOTHBRUSH FOR SIMULTANEOUS-SURFACE AND SULCUS CLEANING

Vacharee S. Peterson, 1618 Eustis, Apt. 7, St. Paul, Minn. 55108

Filed Apr. 18, 1977, Ser. No. 788,128
Int. Cl.[2] A46B *9/04*
U.S. Cl. 15—167 R 4 Claims



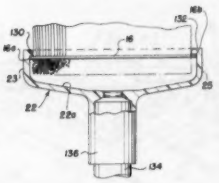
1. A toothbrush consisting essentially of a handle having a necked portion and a head attached to said handle at said necked portion, said head comprising two elongated head portions each having two sides, two ends and two surfaces, one of said two surfaces being a bristle-bearing surface, said head portions being joined in side to side relationship so that said bristle-bearing surfaces together form a face varying from concave to convex and each said head portion having a plurality of bristles of substantially equal length on said bristle-bearing surface disposed in at least two rows extending lengthwise of said head portion and inserted in and secured to said bristle-bearing surface at an angle of less than 90°, and each bristle extending from said head portion to a free end and all the bristles in each said head portion being so inserted in the bristle-bearing surface thereof as to diverge from all the bristles in the adjacent head portion.

4,115,895

MOP CONSTRUCTION

Audrey H. Ballew, Sweetwater, Tex., assignor to Dallas County Association for the Blind, Dallas, Tex.

Division of Ser. No. 680,964, Apr. 27, 1976, Pat. No. 4,043,602.
This application Feb. 4, 1977, Ser. No. 765,435
Int. Cl.[2] A47L *13/20*
U.S. Cl. 15—229 R **1 Claim**



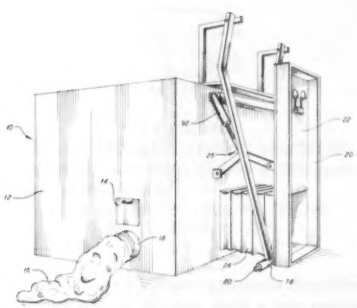
1. A mop head comprising: a hollow holder including an elongated body a cavity formed inwardly from one edge, an outwardly extending handle receiving sleeve secured to said body, said body further having downwardly deflected ends which have opposed shoulders formed therein which extend inwardly from the lower edge of said downwardly deflected ends; a plurality of strands of mop material folded into said cavity in said body; and a straight elongated, flexible retainer wire disposed in said fold of said strands of mop material such that the ends of said retainer wire member are positioned over and abut said shoulders inside of said cavity in said body, said retainer wire retaining said strands of mop material within the cavity.

4,115,896

VEHICLE INTERIOR CLEANING SYSTEM

Dean V. Costanzo, Chittenango, N.Y., assignor to Costanzo Bus Bath, Inc., Chittenango, N.Y.

Filed Dec. 5, 1977, Ser. No. 857,368
Int. Cl.[2] B60S *3/00*
U.S. Cl. 15—301 **10 Claims**



1. Apparatus for removing dirt, trash, and other loose foreign materials from an enclosed interior space having openings substantially at opposite ends thereof by means of an air stream flowing into one and out of the other of the openings, said apparatus comprising:

a. a housing having parallel front and rear end walls;

b. a forward section of said housing adjoining said front wall and extending rearwardly therefrom for a portion of the distance between said front and rear walls and having an interior surface which is convolute in a plane parallel to said end walls;

c. a cylindrical duct having a first open end communicating with an air outlet opening in said front wall and extending through said forward section, substantially coaxially thereof, to a second open end intermediate of said end walls;

d. means defining an air inlet opening tangential to said interior surface of said forward section;

e. a fan mounted within said cylindrical duct for exhausting air from within said housing through said air outlet opening, thereby drawing air into said housing through said tangential air inlet opening and creating a circular flow of air about said convolute surface, exteriorly of said circular duct;

f. a rear section of said housing between said forward section and said rear wall having a cross section such that said flow of air continues in a circular manner from front to rear within said housing before flowing to the central portion of said housing and moving forwardly into and through said cylindrical duct;

g. a trash receiving section communicating with said rear section through an opening in the interior wall thereof adjacent to and extending forwardly from said rear wall, whereby solid material carried by said flow of air is deposited in said trash receiving section as the air flow moves forwardly to said circular duct inlet;

h. means for removing solid material from said trash receiving section; and

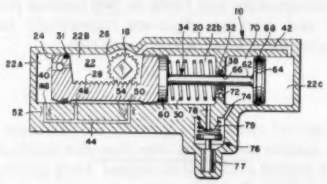
i. means for placing said air inlet opening in substantially sealing communication with said enclosed interior space through said other opening thereof.

4,115,897

ZERO FORCE HOLD OPEN DOOR CLOSER

Richard L. Zunkel, Marshville, N.C., assignor to Eaton Corporation, Cleveland, Ohio

Filed Oct. 11, 1977, Ser. No. 840,696
Int. Cl.[2] E05F *3/00*
U.S. Cl. 16—49 **18 Claims**

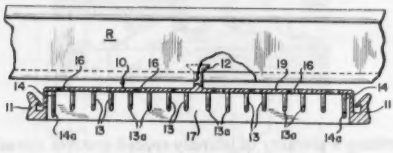


1. A door closer assembly for moving a door connected thereto from an open position toward a closed position comprising a housing, a chamber located in said housing, biasing means disposed in said chamber providing a restoring force to move the door toward its closed position, a piston slidable in said chamber in response to movement of the door, said piston being movable in a first direction against the force of said biasing means as the door moves toward an open position and being biased in a second direction, opposite said first direction, by said biasing means which normally biases the piston to urge the door towards its closed position, and means for rendering said biasing means ineffective to exert said restoring force on said piston to bias the door toward its closing position.

4,115,898
SUPPORT DEVICE FOR VERTICAL SLATS OF A SLATTED BLIND

Kurt Heinz Frentzel, Zevenhoven, Netherlands, assignor to Hunter Douglas International N.V., Willemstad, Netherlands Antilles

Filed Mar. 29, 1977, Ser. No. 782,314
Claims priority, application Fed. Rep. of Germany, Mar. 31, 1976, 2613751
Int. Cl.[2] E05D *13/02*
U.S. Cl. 16—87 R **3 Claims**



1. A device for attaching a slat to a support of a slatted blind comprising an elongated cap; said cap having a pair of spaced substantially parallel side walls, a transverse wall extending between said side walls along their length, and an end wall extending between said side walls at each end thereof; said cap having an open side opposite to said transverse wall; a plurality of support lugs extending from one side wall toward the other side wall for engagement in openings adjacent an end of a slat; at least three ribs extending from the other of said side walls toward said one side wall; said ribs being so dimensioned as to permit deliberate disengagement of a slat from said lugs while insuring maintenance of such engagement under normal use conditions, said ribs being elongated in a direction transverse to the length of said cap, said lugs and said ribs having a sloped surface generally facing the open side of said cap, at least one opening through said transverse wall for insertion of a tool to disengage a slat from said lugs, and the rib adjacent each end of said other wall extending to closer to the open side of said cap than ribs between said end ribs

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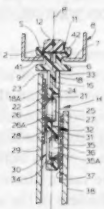
4,115,899
DOUBLE DRAPERY CARRIER

James A. Ford, Sherman Township, St. Joseph County, Mich., assignor to Kirsch Company, Sturgis, Mich.

Filed Oct. 17, 1977, Ser. No. 842,554
Int. Cl.[2] A47H *13/00, 15/00*
U.S. Cl. 16—87.4 R **2 Claims**



1. In a rigid hanger for slidably supporting a drapery on a traverse rod having an elongate bottom slot, said hanger including a head portion slidably supported on said rod and projecting downwardly through said slot, said head portion having groove means into which projects said rod, said head portion being attached to an elongate flexible element which has a plurality of said head portions connected thereto at predetermined intervals, and a pendant portion integral with and projecting downwardly from said head portion for releasable attachment with the drapery, the improvement wherein said pendant portion comprises:

a depending plate portion fixed centrally to said head portion and projecting downwardly therefrom, said depending plate portion defining a central vertical plane which contains the central axis of the head portion and is aligned with the lengthwise extent of the slot;

an upper plate portion fixed to the lower edge of said depending plate portion and projecting downwardly therefrom, said upper plate portion being parallel with and horizontally offset a selected distance to one side of said central plane;

a lower plate portion fixed to the lower edge of said upper plate portion and projecting downwardly therefrom, said lower plate portion being parallel with and horizontally offset said selected distance to the other side of said central plane;

first means associated with said upper plate portion for permitting attachment thereto of a first drapery which is positioned on said one side of said central plane adjacent the outer side of said upper plate portion, said first means including a first opening positioned centrally of said upper plate portion and extending horizontally therethrough for reception of a first snap button associated with said first drapery;

second means associated with said lower plate portion for permitting attachment thereto of a second drapery which is disposed on said other side of said central plane adjacent the outer side of said lower plate portion, said second means including a second opening positioned centrally of said lower plate portion and extending horizontally therethrough for reception of a snap button associated with said second drapery;

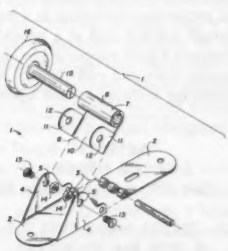
an upper annular reinforcing flange fixed to the inner side of said upper plate portion in surrounding relationship to said first opening, said annular flange being of substantially larger diameter than said first opening and terminating in a free edge located substantially in a vertical plane defined by the outer side of said lower plate portion; and

a lower annular reinforcing flange fixed to the inner side of said lower plate portion in surrounding relationship to said second opening, said lower annular flange being of substantially larger diameter than said second opening and terminating in a free edge disposed substantially within a second vertical plane defined by the outer side of said upper plate portion.

4,115,900
HINGE AND ROLLER SUPPORT DEVICE FOR SECTIONAL DOOR

Arthur Mihalcheon, 74 Valleyview Crescent, Edmonton, Alberta, Canada

Filed Aug. 16, 1976, Ser. No. 714,303
Int. Cl.[2] E05D *15/04*
U.S. Cl. 16—104 **1 Claim**



1. A hinge and roller support device for a sectional door, comprising:

a pair of plates hinged together end to end and adapted to be attached to the door;

one of the plates having a pair of spaced bearing support ears

upstanding therefrom, each ear forming a transverse bolt-receiving aperture spaced above the plate;

a bearing member comprising a tubular support portion, for receiving the shaft of a roller, and an arm portion of generally right-angled configuration and extending from the support portion, said arm portion comprising a tongue portion, extending from the tubular support portion, and a pair of spaced apertured lugs projecting from the side edges of the tongue portion at its end remote from the tubular support portion, said lugs forming said right angles with the tongue portion, whereby, when the elements are assembled, the apertures of the lugs are located adjacent to and in alignment with the ear apertures;

threaded bolt means for connecting the support ears and the lugs by extension through the adjacent pairs of apertures; and

nut means threadable on the bolt means for disengagably locking the bearing member to the support ears;

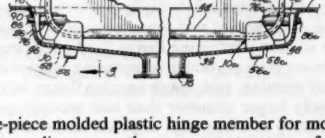
whereby the arm portion can be rotated about the bolt means to vary the distance of the tubular support portion from the plates and then be fixed in place by tightening only the bolt and nut means recited.

4,115,901

LAUNDRY APPLIANCE DOOR HINGE

Bradley J. Schmidt, East Dundee, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Aug. 4, 1977, Ser. No. 821,650
Int. Cl.[2] E05D *7/12, 5/10*
U.S. Cl. 16—176 **12 Claims**



1. A one-piece molded plastic hinge member for mounting a door on an appliance or other support structure of the type described having an aperture therethrough, said hinge member comprising a body portion for overlying said support structure, an integral attachment prong portion projecting in one direction from said body portion for insertion through said aperture and securing the hinge member to said support structure, a pintle spaced from said body portion oppositely from said prong portion for pivotal connection with a door to be mounted, a support element integrally joining said pintle and said body portion, and an integral pad element located at a position behind said pintle for engaging a door supported by the pintle when said door is in an open position and preventing substantial contact between said door and any adjacent part of the support structure, and a stop element integral with said body portion and projecting therefrom in a direction opposite from said attachment portion and at a location forwardly of said pintle for engaging a door supported by the pintle at a side of the pintle opposite from said pad element when the door is in said open position for resisting further opening of the door.

4,115,902

BRACE HINGE

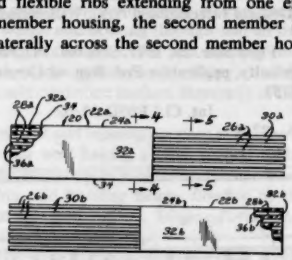
Glenn N. Taylor, Cary, Ill., assignor to The Kendall Company, Boston, Mass.

Division of Ser. No. 792,824, May 2, 1977. This application Feb. 15, 1978, Ser. No. 878,051
Int. Cl.[2] E05D *15/58*
U.S. Cl. 16—179 **11 Claims**

1. A hinge, comprising:

a first hinge member having a housing, and a plurality of elongated flexible ribs extending from one end of said housing, said ribs being spaced laterally across the housing and defining a plurality of laterally spaced grooves extending longitudinally in the housing; and

a second hinge member having a housing, and a plurality of elongated flexible ribs extending from one end of the second member housing, the second member ribs being spaced laterally across the second member housing and



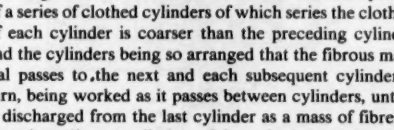
defining a plurality of laterally spaced grooves extending longitudinally in the second member housing, said ribs of the first hinge member being slidably received in the grooves of the second hinge member, and said ribs of the second hinge member being slidably received in the grooves of the first hinge member.

4,115,903

PROCESSING OF FIBROUS MATERIALS TO REDUCE SAME TO A GENERALLY HOMOGENEOUS MASS OF FIBERS

Norman B. Barber, Cleckheaton, England, assignor to Garnett-Bywater Limited, Cleckheaton, England

Filed Feb. 10, 1977, Ser. No. 767,544
Int. Cl.[2] D01G *15/12*
U.S. Cl. 19—99 **2 Claims**



1. A method of processing fibrous materials to produce a homogeneous mass of fibres wherein, the method includes the steps of:

(a) feeding the fibrous material to the first clothed cylinder of a series of clothed cylinders of which series the clothing of each cylinder is coarser than the preceding cylinder, and the cylinders being so arranged that the fibrous material passes to the next and each subsequent cylinder in turn, being worked as it passes between cylinders, until it is discharged from the last cylinder as a mass of fibres;

(b) rotating adjacent cylinders of the series in opposite directions and so that the peripheral speed of each cylinder is greater than the preceding cylinder;

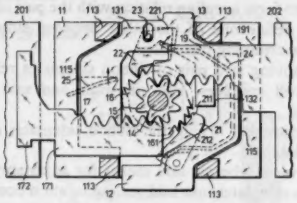
(c) working the material with at least one clothed worker roller arranged tangentially with respect to two adjacent cylinders of the series by rotating said worker roller in the same direction as the slower peripheral speed roller of said pair and having a peripheral speed less than that of the slower peripheral speed roller of said pair;

(d) creating a flow of air along the path of travel of the material to cool, and assist in transporting same by rotating the cylinders at a sufficiently high speed and by encasing the cylinders with cover means closely matching the peripheral shape of the cylinders and having only an inlet and outlet for the entry and escape of air.

4,115,904
LOCK FOR BRACELETS, BELTS AND THE LIKE

Robert Zwyssig, Schaffhausen, and Bernhard Tesch, Ennetbürgen, both of Switzerland, assignors to Zwyro A.G., Switzerland

Filed Mar. 18, 1977, Ser. No. 778,999
Claims priority, application Fed. Rep. of Germany, Mar. 19, 1976, 2611651
Int. Cl.[2] A44C 5/18; A44B 11/26
U.S. Cl. 24—19 15 Claims

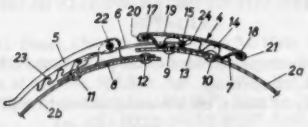


1. Lock for connecting the two ends of a bracelet, belt and the like, which is detachably connected to at least one end of the bracelet, characterized in that each of the two ends of the bracelet is connected with a movable lock part, said lock including means mounting said lock parts for movement essentially in the lengthwise direction of the bracelet in the opposite directions, drive means for effecting synchronous movement of said lock parts, and latch means for locking said drive means in a selected position, said lock including a housing, and the movable lock parts being sliders guided inside lengthwise guides of said lock housing, said sliders including gear racks and said drive means including a gear meshed with said gear racks from opposite sides, said latch means including a disconnectable locking latch, a disconnect key for disengaging said locking latch.

4,115,905
FASTENER FOR SHOES

Sigurd Seidel, Graz, Austria, assignor to Skischuhfabrik Dynafit Gesellschaft m.b.H., Graz, Austria

Filed May 23, 1977, Ser. No. 799,232
Int. Cl.[2] A43C 11/14
U.S. Cl. 24—69 SK 4 Claims

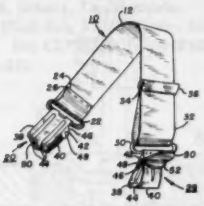


1. A fastener for a shoe, particularly for a sports shoe, comprising a strap having connection means at each end for connecting the strap, a buckle formed with female detent means for receiving and retaining the connection means of one end of the strap, a retaining plate having at least two succeeding female detent means for releasably receiving the connection means of the other end of the strap, and covering means for covering the female detent means in the retaining plate, the covering means having a cap formed of extensible material formed with pockets at opposite ends, the retaining plate having raised edge portions for receiving the pockets in such manner that the cap is under initial stress.

4,115,906
CLIPPABLE TROUSER RETAINING STRAP

Mortimore Lavine, and Leanelda Lavine, both of 425 Randall Ave., Trenton, N.J. 08610

Filed Aug. 1, 1977, Ser. No. 820,905
Int. Cl.[2] A41F 17/04
U.S. Cl. 24—72 2 Claims



1. A clippable trouser retaining strap for maintaining a cuff of an unmodified trouser leg of a user in a downward position comprising:

an elongated elastic member of adjustable length, said elongated elastic member for placement beneath the foot of the user, said elongated elastic member being elastic in a direction along the longitudinal axis thereof, said elongated elastic member being tapered from the longitudinal axis thereof to the longitudinal edges thereof, said edges being thinner than the portion of said elastic member adjacent to the longitudinal axis thereof;

a first locking clip secured to one end of said elongated elastic member, said clip for engaging a first portion of said cuff, said first clip being selectively securable to said first portion;

a second locking clip secured to said elongated elastic member adjacent to the other end thereof, said second locking clip for engaging a second portion of said cuff, said second clip being selectively securable to said second portion, said first and second portions of said cuff being substantially opposite each other;

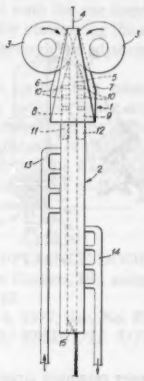
a locking clamp for adjusting the length of said elongated elastic member, said locking clamp fixedly secured to said other end of said elastic member, an elongated ring being provided by said second locking clip, a portion of said elongated elastic member adjacent to said other end thereof passing through said elongated ring and being positioned adjacent to said elastic member, said clamp being selectively clampable to said elastic member, the positioning of said clamp on said elongated elastic member adjusting the length thereof; and

said first and second locking clips each including a pair of jaws pivotally affixed together, and a clamp element having a tongue projecting therefrom, a bracket fixedly secured to one of said jaws, said clamp element pivotally mounted by said bracket adjacent to the juncture of said tongue thereof, each of said jaws providing a plurality of teeth for engaging said cuff, urging of said clamp element toward said pair of jaws causing said tongue to engage the other of said jaws thereby effecting the locking of said jaws together.

4,115,907
FIBER PROCESS

Ronald Lawson, and David Watson, both of Harrogate, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Sep. 9, 1977, Ser. No. 831,827
Claims priority, application United Kingdom, Sep. 9, 1976, 37386/76
Int. Cl.[2] D02G *1/12*
U.S. Cl. 28—266 **3 Claims**

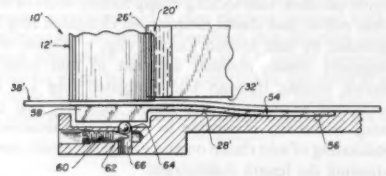


1. In a process for the continuous production of heat-set, crimped, thermoplastic filaments selected from the group consisting of polyamide filaments or copolyamide filaments and polyester filaments or copolyester filaments, comprising feeding by means of conveyor surfaces, a tow of filaments into the crimping chamber of a stuffer box crimper to crimp the tow, and passing the crimped tow through a heat setting device attached to the exit of the stuffer box crimper, the improvement comprising cooling the tow while in the crimping chamber to a temperature not exceeding 100° C.

4,115,908
APPARATUS FOR STUFFER BOX CRIMPING

Daniel Isaiah Saxon, Kingsport, and Vernon Leon Leonard, Bristol, both of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 6, 1978, Ser. No. 875,468
Int. Cl.[2] D02G *1/12*
U.S. Cl. 28—269 **3 Claims**



1. In an apparatus for crimping continuous filament tow, said apparatus having

a stuffer box crimping chamber;

a pair of coacting feedrolls spaced closely together so as to form therebetween a nip through which moving continuous filament tow is fed into the stuffer box crimping chamber;

a pair of scraper blades extending longitudinally generally parallel to and at right angles to the axes of the coacting feedrolls and forming two opposed sides of the crimping chamber, each scraper blade having a blade edge positioned so that it nearly touches one of the feedroll surfaces;

a pair of sidewalls, each sidewall extending along the length of the stuffer box crimping chamber and also along and adjacent the endfaces of the coacting feedrolls and the side edges of the pair of scraper blades;

a pair of moveable ribbon sideplates, each ribbon sideplate positioned so as to bridge the nip of the coacting feedrolls along their endfaces in sealing relation therewith and also to extend into the crimping chamber along one of the sidewalls to form a sealing relation with the pair of scraper blades to define one of the other opposed sides of the stuffer box crimping chamber;

means for moving said pair of ribbon sideplates relative to said feedroll endfaces, said sidewalls and said scraper blades; and

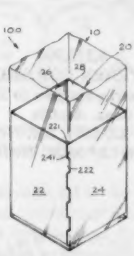
means for adjustably urging the ribbon sideplates into said sealing relation;

the improvement wherein said means for adjustably urging the ribbon sideplates into said sealing relation comprises a pair of flexible backing members, each backing member flexibly bearing in supporting relation against one side of one of the ribbon sideplates along its length from the coacting feedrolls and into the crimping chamber and providing a smooth, elastic curved surfaced path for the ribbon sideplate to move thereagainst in all positions of its adjustment, one end of the flexible backing member being connected in cantilevered manner at a location beyond the exit end of, the the nip of the feedrolls.

4,115,909
REINFORCING INSERT FOR COLLAPSIBLE PACKAGES

Arthur P. Corella, 8166 Vanscoy Ave., North Hollywood, Calif. 91602

Continuation-in-part of Ser. No. 717,097, Aug. 24, 1976, abandoned. This application Nov. 21, 1977, Ser. No. 853,122
Int. Cl.[2] B65D *5/42*
U.S. Cl. 229—48 R **12 Claims**



1. A reinforcing insert for flexible packaging, formed from a single blank, comprising:

a plurality of facets, each corresponding to a panel in said blank;

a plurality of fold lines, each corresponding to a score line in said blank for defining said panels; and

a plurality of alternating projecting tabs and intervening spaces in each of matable edges of at least two of said facets, said tabs being substantially straight and substantially rectangular and said spaces being substantially rectangular, said tabs and spaces being so conformed that the tabs in one of said matable edges substantially dimensionally correspond to the spaces in the other of said matable edges, said projecting tabs in the matable edges being interleaved to form a seam, with each of the projecting tabs forming said seam being substantially unbent and substantially in the same plane as its adjoining facet and

the outer ends of the projecting, unbent tabs demarcating said seam.

4,115,910

ROLLER REINFORCED WITH A HARD METAL JACKET

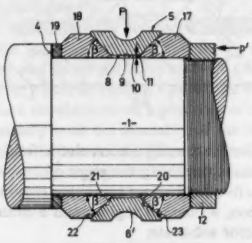
Gunther Hertel, Weissenseestrasse 9, D-8500, Nurnberg, and Karl Gustav Hertel, Espanstrasse, 6, D-8510 Furth, both of Fed. Rep. of Germany

Filed Apr. 27, 1977, Ser. No. 791,297

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1976, 2629802

Int. Cl.[2] B21B *27/02*

U.S. Cl. 29—123 3 Claims



1. In a hot roller for working material, which roller includes a rotatably mounted roller body, a reinforcing working jacket composed of hard metal and having the form of a hollow cylinder disposed around the roller body, clamping means mounted between the roller body and the jacket and including clamping rings bearing against the axial end surfaces of the jacket and means acting via the rings for applying an axial compressive prestress force to the jacket, the axial end surfaces of the jacket and the clamping ring surfaces which bear thereagainst being inclined with respect to the roller axis, and the roller body and working jacket defining an annular gap between the inner peripheral surface of the working jacket and the outer peripheral surface of the roller body, the dimension of the annular gap in the direction between said jacket and roller body being sufficiently large to maintain the outer peripheral surface of the roller body and the inner peripheral surface of the working jacket out of contact with one another during operation of the roller at temperatures extending over its entire operating temperature range, the improvement wherein the clamping surfaces at opposed ends of said working jacket diverge from one another in the radial direction away from the roller axis.

4,115,911

METHOD OF MAKING RETIPPED TOP-DRIVE FILLING SPINDLES

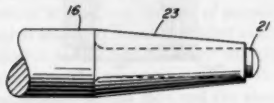
Ernest G. Poole, Charlotte, and Lucius M. Hair, Pineville, both of N.C., assignors to The Kendall Company, Boston, Mass.

Division of Ser. No. 568,560, Apr. 16, 1975, Pat. No. 4,010,600.

This application Jan. 10, 1977, Ser. No. 757,949

Int. Cl.[2] B22D *19/10;* B23P *7/00*

U.S. Cl. 29—401 D 6 Claims



1. A method of making a top-drive filling spindle having a tapered tip thereon of hardened material comprising:

forming a neck portion on the uppermost tip of a top-drive filling spindle blade, said neck portion being of reduced diameter and sufficient length as to accept a sleeve of hardened material thereon;

placing a sleeve of hardened material over said neck portion;

causing said sleeve to become securely attached to said neck portion in butting relationship with said spindle blade; and,

forming a predetermined taper uniformly on said sleeve of hardened material.

4,115,912

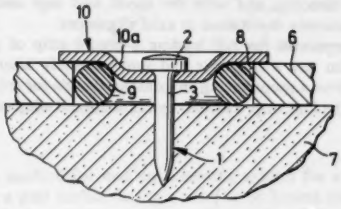
METHOD OF AND ASSEMBLY FOR FASTENING OBJECTS ON A SUPPORT MATERIAL

Franz Beck, Schaan, Liechtenstein, assignor to Hilti Aktiengesellschaft, Schaan, Liechtenstein

Filed Jan. 17, 1977, Ser. No. 760,025

Int. Cl.[2] B23P *11/00;* F16B *15/00*

U.S. Cl. 29—432 4 Claims



1. A method of attaching objects to a support material by means of fastening elements having a head and a shank extending axially from the head with the head having a greater diameter than the shank, which fastening elements are driven into the support material by an explosive powder charge operating setting device, comprising the steps of laterally enclosing the shank of the fastening element with a ring-shaped elastic member having a dimension between its inside diameter and outside diameter in the range of one to five times the diameter of the shank of the fastening element, forming an opening in the object to be attached with the opening having a diameter and shape corresponding substantially to the outside diameter and contour of the elastic member, driving the fastening element by means of an explosive powder charge into the support material and seating the elastic member within the opening in the object for attaching the object to the support material and separating the object from the shank of the fastening element by means of the elastic member so that the forces acting through the object transverse to the axial direction of the fastening elements are at least damped by the elastic member, separating the head of the fastening element from the elastic member with a metal washer having an outside diameter greater than the outside diameter of the elastic member, and placing the elastic member in spaced relationship with the shank of the fastening element.

4,115,913

METHOD AND APPARATUS FOR WIND LOADING FILM MAGAZINES

Ikuro Moriya, and Masao Tsuruta, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 9, 1977, Ser. No. 795,267

Claims priority, application Japan, May 10, 1976, 51-52991

Int. Cl.[2] B23P *19/02, 21/00*

U.S. Cl. 29—450 4 Claims

1. A method for roll loading a precut strip of photographic film into a magazine and simultaneously assembling the latter from a spool having an axial slot therein for receiving an end of the film strip, a slotted cylindrical shell adapted to be concentrically disposed around the spool, and a pair of opposite end caps adapted to be disposed over the spool ends and to engage the ends of the shell, characterized by the steps of:

(a) inserting the leading end of the film strip into the spool slot,

(b) rotating the spool to wind the film strip thereon until only a predetermined tail end length of the film strip remains unwound and extending outwardly from the spool,

(c) axially moving the shell over the wound spool to concentrically surround the spool with the tail end of the film strip extending through the shell slot,

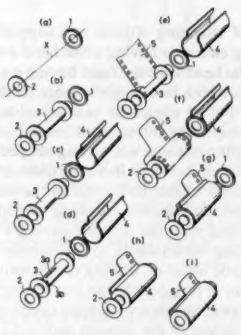
(d) squeeze engaging the shell to close the slot therein and reduce the shell diameter,

(e) axially moving the end caps toward each other, over the ends of the spool, and into contact engagement with the ends of the shell, and

(f) releasing the shell to enable it to diametrically expand into locking engagement with the end caps,

(g) all of the above steps being carried out during the continuous movement of the film, spool, end caps and shell in the same direction and with the spool, end caps and shell continuously maintained in axial alignment.

2. An apparatus for roll loading a precut strip of photographic film into a magazine and simultaneously assembling the latter from a spool having an axial slot therein for receiving an end of the film strip, a slotted cylindrical shell adapted to be



concentrically disposed around the spool, and a pair of opposite end caps adapted to be disposed over the spool ends and to engage the ends of the shell, said spool, shell and end caps being continuously maintained in axial alignment, said apparatus characterized by:

(a) means for inserting the leading end of the film strip into the spool slot,

(b) means for rotating the spool to wind the film strip thereon until only a predetermined tail end length of the film remains unwound and extending outwardly from the spool,

(c) means for axially moving the shell over the wound spool to concentrically surround the spool with the tail end of the film strip extending through the shell slot,

(d) means for squeeze engaging the shell to close the slot therein and reduce the shell diameter,

(e) means for axially moving the end caps toward each other, over the ends of the spool, and into contact engagement with the ends of the shell,

(f) means for releasing the shell to enable it to diametrically expand into locking engagement with the end caps, and

(g) conveyor means mounting all of the means recited in sub-paragraphs (b)–(f), inclusive, for continuous movement in the same direction during their operation.

4,115,914

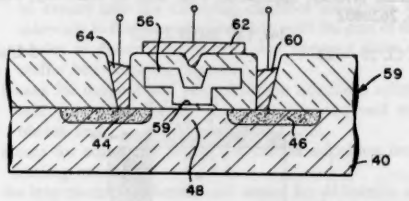
ELECTRICALLY ERASABLE NON-VOLATILE SEMICONDUCTOR MEMORY

Eliyahou Harari, Irvine, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Division of Ser. No. 671,183, Mar. 26, 1976. This application Feb. 22, 1977, Ser. No. 770,346

Int. Cl.[2] H01L *29/78*

U.S. Cl. 29—571 **12 Claims**



1. A process for fabricating a nonvolatile field effect transistor storage device comprising the steps of:

(a) forming active field effect transistor regions, including a source region, a channel region, and a drain region, in a semiconductor substrate;

(b) forming a first layer of a dielectric material on top of said active field effect transistor regions having a relatively thin section therein spatially disposed entirely over one of said active field effect transistor regions;

(c) forming a layer of resistive material on top of said dielectric layer and extending over said relatively thin section to thereby form a first gate electrode;

(d) forming a second dielectric layer up to 300A thick on top and around said resistive material thereby electrically isolating said first gate electrode and making it a floating gate electrode;

(e) forming a second gate electrode on top of said new dielectric layer and spatially disposed over said first gate electrode and covering the entire length of said channel region.

4,115,915

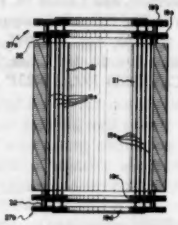
PROCESS FOR MANUFACTURING MOTOR HAVING WINDINGS CONSTRUCTED FOR AUTOMATED ASSEMBLY

David E. Godfrey, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 600,875, Jul. 31, 1975, abandoned. This application May 11, 1977, Ser. No. 795,737

Int. Cl.[2] H02K *15/06*

U.S. Cl. 29—596 **4 Claims**



1. A process for manufacturing an electric machine stator core and winding assembly with sectionalized coils comprising the steps of

providing a magnetic stator core having opposing end faces

and a plurality of peripherally spaced, axially extending stator slots,

cutting a continuous length of electrical wire with a rectangular cross section into straight coil side wires of different lengths, forming bundles of straight coil side wires with graduated lengths of wire in each bundle which are stacked in a predetermined pattern, and applying an external insulating layer to every bundle while leaving the end portions of the coil side wires exposed,

inserting said coil side wire bundles longitudinally into designated stator slots,

fabricating end cap rigid insulating boards each with an adhered planar array of rectangular cross section coil end turn conductors having the ends thereof exposed in a predetermined pattern,

successively assembling the end cap boards in superimposed relationship in two groups respectively parallel to the stator core end faces with the ends of selected coil side wires in every bundle butting against the ends of selected coil end turn conductors on a plurality of end cap boards and, alternately with the assembly of the end cap boards, making joints between coil side wires and end turn conductors in butting engagement to form a continuous winding.

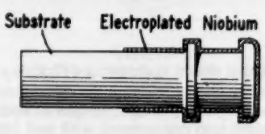
4,115,916
AC SUPERCONDUCTING ARTICLES AND A METHOD FOR THEIR MANUFACTURE

Robert Wagner Meyerhoff, Croton-on-Hudson, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 359,377, May 11, 1973, Pat. No. 3,906,412, which is a continuation of Ser. No. 160,926, Jul. 8, 1971, abandoned, which is a continuation of Ser. No. 701,594, Jan. 30, 1968, abandoned. This application Jul. 17, 1975, Ser. No. 596,621

Int. Cl.[2] H01V *11/00*

U.S. Cl. 29—599 **1 Claim**



1. A method of fabricating an AC superconducting transmission line for continuously transmitting AC power at power line frequencies with very low AC hysteretic losses which remain low even at high current density and/or high AC magnetic fields comprising the steps of: forming at least one multilayer tubular conductor wherein one outer layer of said tubular conductor is niobium and wherein a second layer of said conductor is composed of a material selected from the group consisting of copper, iron, ferrous alloys and nickel; said niobium layer being formed as a direct deposit onto said second layer by electrolyzing with the aid of an anode and the exposed second layer as cathode, and an electrolytic melt consisting of: (a) a base melt of at least one fluoride of potassium, rubidium, of cesium and at least one fluoride of other elements higher in the electromotive series than niobium, and (b) at least one fluoride of niobium, the proportions of said fluorides in said melt, the temperature of said melt and the electrolyzing current density being adjusted to produce a dense, structurally coherent deposit of said niobium upon said second layer; and enclosing said tubular conductor within a cryogenic envelope adapted to establish a cryogenic environment necessary to render said niobium superconductive.

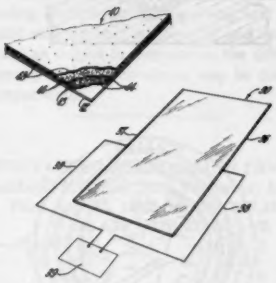
4,115,917
METHOD FOR MAKING AN ELECTRICALLY CONDUCTIVE PAPER

Clarence W. Charon, Newark, Ohio, and Laurent C. Renaud, Pittsfield, Mass., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Jun. 23, 1975, Ser. No. 589,304

Int. Cl.[2] H05B *3/00*

U.S. Cl. 29—611 **1 Claim**



1. A method for making a heating system for a dwelling having a wall surface facing a room to be heated comprising:

a. adhering a bi-layered sheet of glass fiber felted paper to said wall surface, said sheet having a front electrically conductive layer of glass fibers having electrically conductive fibers dispersed in contact relationship throughout and an electrically non-conductive back layer of glass fibers;

b. fixing a first electrical conductor on the front surface of said sheet;

c. fixing a second electrical conductor on the front surface of said sheet in spaced relationship to said first electrical conductor; and,

d. connecting different polarities of a power supply to said conductors.

4,115,918
METHOD OF MAKING ELECTRIC APPLIANCE WITH INTERMITTENTLY STAKED SHEATHED HEATING ELEMENT

Richard F. Anderl, Chippewa Falls, and Lawrence J. Tienor, Eau Claire, both of Wis., assignors to National Presto Industries, Inc., Eau Claire, Wis.

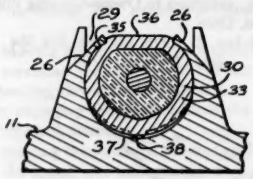
Division of Ser. No. 736,449, Oct. 28, 1976, Pat. No. 4,052,590. This application Jun. 15, 1977, Ser. No. 806,729

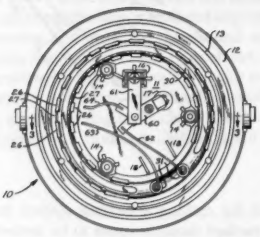
Int. Cl.[2] H05B *3/00*

U.S. Cl. 29—611 **7 Claims**

1. Method of staking a sheathed heater element within a receiving channel having upstanding walls therefor in one wall of a cooker comprising the steps of locating the heater element within the channel between the upstanding walls thereof, shearing and pressing longitudinally spaced segments of the outer edge of the channel walls into the sheath of the located

heater element, and flattening the sheathed heater element along its length between said pressed segments to urge said





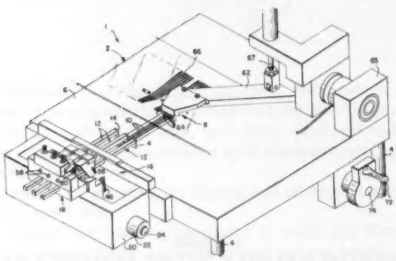
sheathed heater element into close surface contact with the channel base and sides.

4,115,919

MACHINE FOR PRESS FIT INSERTION OF CHIP DEVICES

Harold Oakley Woolley, Jr., Hershey, and Charles Richard Wise, Jr., Annville, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 25, 1977, Ser. No. 844,854
Int. Cl.[2] H05K *3/32*
U.S. Cl. 29—740 **2 Claims**



1. An insertion device for small conductive chips, comprising:

a work table having a planar surface provided with a work station and a plurality of parallel vertically recessed paths communicating with said work station,

a sweep in alignment with each said paths whereby chips serially aligned along said paths are urged by said sweep toward said work station,

a pressure arm at said work station for horizontally pressing a substrate against said table,

said pressure arm having a plurality of spaced feet engaging said substrate, said feet being interdigitated with said paths,

an inserter ram mounted under said table for vertical reciprocation towards and away from said substrate at said work station,

said inserter ram having a plurality of heads entering into respective tracks during reciprocation toward said substrate,

a first pivot arm for urging said sweep along said path,

jam clamp means connecting said first pivot arm and said sweep,

a cam shaft having a first cam,

a second pivot arm connected at one end with said cam and at another end to said inserter ram and said first pivot arm, and

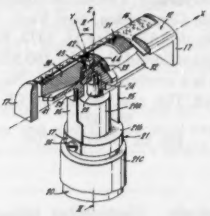
crank arm means for rotating said cam shaft whereby said cam is rotated pivoting said second pivot arm to vertically reciprocate said inserter ram for vertical insertion of a foremost chip of each said paths into a corresponding opening of said substrate, and whereby said inserter ram upon return vertical reciprocating motion pivots said first pivot arm to urge said sweep along said paths and thereby advance a serial array of chips along each said paths.

4,115,920

DRY SHAVER WITH PRIMARY AND SECONDARY MODES OF OSCILLATION

Enzo Ascoli, Lausanne, Switzerland, assignor to The Gillette Company, Boston, Mass.

Filed Apr. 27, 1977, Ser. No. 791,648
Claims priority, application United Kingdom, May 13, 1976, 19706/76
Int. Cl.[2] B26B *19/26, 19/02*
U.S. Cl. 30—43.3 **10 Claims**



1. An electric dry shaver comprising a flexible part-cylindrical curved cutting foil; a cutter body having a plurality of cutter blades with cutting edges; means urging said cutter blade cutting edges into engagement with said foil; and driver means adapted to drive said cutter body both in a primary mode of oscillation along a linear path substantially parallel to said foil to effect a shaving action and in a secondary mode of oscillation along a linear path at an angle to said foil to cause said foil to oscillate in sympathy with said secondary mode of oscillation of said cutter body, the frequency of said secondary mode of oscillation being at least twice the frequency of said primary mode of oscillation.

4,115,921

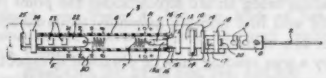
EXTRAORAL FORCE-APPLYING ORTHODONTIC APPLIANCE

Maclay M. Armstrong, Seattle, Wash., assignor to Northwest Orthodontics, Inc., Seattle, Wash.

Continuation-in-part of Ser. No. 655,401, Feb. 5, 1976, which is a continuation-in-part of Ser. No. 613,243, Aug. 15, 1975, abandoned. This application May 6, 1977, Ser. No. 794,407
Int. Cl.[2] A61L *7/00*
U.S. Cl. 32—14 D **91 Claims**

1. In an orthodontic appliance including force-reaction means engageable with the wearer's head and/or neck, orthodontic force-applying means for applying force to a jaw and connector means connecting the force-reaction means and the

force-applying means and including resilient force-producing means for producing a yieldable force applied to the force-applying means, the improvement comprising means for providing relative movement of the force-reaction means and the



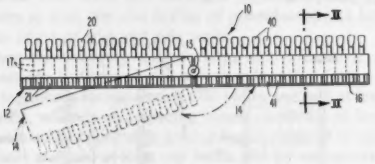
force-applying means away from each other free of the yieldable force of the resilient force-producing means automatically in response to relative movement of the force-reaction means and the force-applying means away from each other beyond a predetermined limit.

4,115,922

DENTAL CROWN AND BRIDGE SHADING SYSTEM

C. Gale Alderman, 437 Donalyn La., Berwyn, Pa. 19312

Filed Sep. 20, 1976, Ser. No. 724,981
Int. Cl.[2] G09B *19/00*
U.S. Cl. 32—71 **4 Claims**



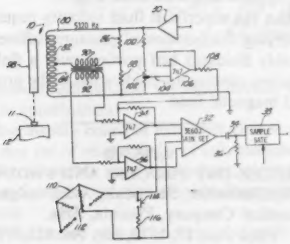
1. In a shade guide for dental crowns and bridges, the combination of a holder, a plurality of gingival shade selectors held thereby and a separate plurality of incisal shade selectors held thereby, each such selector comprising a shade button having an opaque backing layer, with each shade button of the gingival shade selectors having a concave portion tapering to a relatively thin edge, and each shade button of the incisal shade selectors having a corresponding edge portion that is convex and relatively thicker than that of the gingival shade button.

4,115,923

ELECTRONIC COLUMN GAGE

David L. Smith, Brighton, and Norman J. Scherr, Jr., Warren, both of Mich., assignors to The Valeron Corporation, Oak Park, Mich.

Division of Ser. No. 606,444, Aug. 21, 1975, Pat. No. 4,038,756.
This application Mar. 7, 1977, Ser. No. 775,256
Int. Cl.[2] G01B *7/14*
U.S. Cl. 33—172 E **3 Claims**



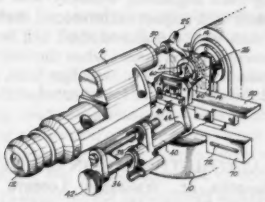
1. A probe for use with an electronic sizing gage comprising first and second normally balanced inductive sensing circuits, including respective coil portions; part contacting means including a movable ferrite member juxtaposed to said coil portions, and means altering the balance between said circuits in response to movement of said member according to part size, means producing an electrical output signal representing the degree of imbalance produced by said movable member; said means including excitation means for applying an excitation signal of alternating waveform to the first and second circuits; and, nulling means adding selectively variable portions of said excitation signal to said electrical output signal for reducing said electrical output signal to zero irrespective of the degree of imbalance between said first and second circuit, said nulling means including amplifier means receiving said electrical output signal and said variable portions of said excitation signal and producing an output in response to the difference in said signals, whereby said null condition may be detected by said amplifier output signal.

4,115,924

SPECTACLE LENS MARKING DEVICE

Dick L. Kleinkopf, P.O. Box 1660, Fairbanks, Ak. 99707

Filed Aug. 25, 1977, Ser. No. 827,580
Int. Cl.[2] G01B *11/27*
U.S. Cl. 33—174 A **4 Claims**



1. In combination with a lensometer for locating the optical center of a ground lens for eye spectacles having means to move the lens relative to the line of sight of the lensometer until the optical center of the lens coincides with the optical center determined by said lensometer, the improvement comprising a frame carried by said lensometer; spaced apart, first lens marking means carried by said frame for marking said lens with two spaced apart marks located at predetermined positions with respect to the optical center of said ground lens, the two spaced apart marks and the optical center being colinear; and first fixed scale carried by said frame; a slide member slidably connected with said frame, having a reference mark thereon cooperating with said fixed scale, and having a second marking means for forming a mark in a predetermined spaced relationship with respect to said reference mark; and means for adjustably moving said slide member amounts corresponding to the desired spacing between the optical center of the ground lens and the optical center of the lens when mounted in an eye spectacle.

4,115,925

SHAFT ALIGNER

Stephen P. Malak, 1720 N. Prospect Ave., Milwaukee, Wis. 53202

Filed May 16, 1977, Ser. No. 797,302
Int. Cl.[2] G01B *7/31*
U.S. Cl. 33—181 R **26 Claims**

10. A shaft aligner for statically aligning a first shaft with a second shaft comprising:

a first universal joint comprising a first yoke and a second yoke pivotally mounted on a first support;

a second universal joint comprising an input yoke and an output yoke pivotally mounted on a second support;

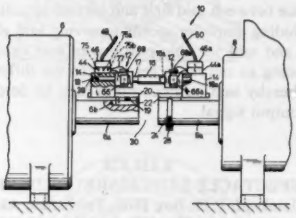
first axial sensing means mounted on the first universal joint

to sense angular orientation of the first yoke with respect to the second yoke and providing a first signal and a second axial sensing means mounted on the second universal joint to sense angular orientation of the input yoke with respect to the output yoke and providing a second signal;

means for mounting the first yoke to the first shaft;

means for mounting the input yoke to the second shaft;

a connector member connecting the second yoke to the output yoke; and



alignment readout means having a defined align node and responsive to the first signal and second signal for visually displaying shaft alignment, whereby with adjustment of the first shaft with respect to the second shaft alignment of the first shaft with the second shaft will be indicated by the alignment readout means when the first yoke and the second yoke are oriented at the align node, and the input yoke and the output yoke are oriented at the align node.

4,115,926

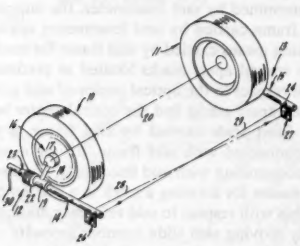
AUTOMOTIVE TOE-IN GAUGE

Robert S. Hampton, Jr., Waukegan; Leonard A. Morrison, Chicago; John W. Murphy, Waukegan, and Craig E. Mountz, Libertyville, all of Ill., assignors to Ammco Tools, Inc., North Chicago, Ill.

Filed Jun. 27, 1977, Ser. No. 810,294

Int. Cl.[2] G01B *11/26*

U.S. Cl. 33—288 **4 Claims**



1. For use in a wheel alignment system, the combination of a first housing assembly,

means for temporarily fixedly connecting said first housing assembly to a first wheel which is to be aligned,

said first housing assembly having an optical system which includes means for generating a light beam emanating from said first housing assembly for reception on a target screen carried by a similar, oppositely positioned second housing assembly associated with a second wheel which is located axially opposite said first wheel, and

a target screen carried by said first housing assembly for receiving a light beam emanating from means for generating a light beam emanating from said second housing assembly,

means for eliminating the effect of physical displacement of a housing assembly from an initial line of reference, such as the horizontal, due to forces applied to the wheel with which it is associated during the alignment procedure,

said displacement elimination means comprising a plurality of visible indicia on said target screen carried by said first housing assembly,

each indicia being an arc struck about the point of connection of said first housing assembly to its associated first wheel as a center,

whereby a true reading may be obtained irrespective of the displacement of said first housing assembly from an initial line of reference as by movement of said first wheel during the alignment procedure, and consequent movement of said first housing assembly therewith.

4,115,927

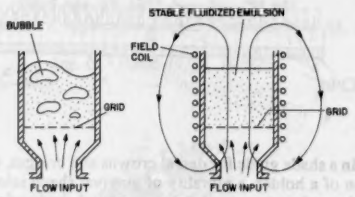
PROCESS FOR OPERATING A MAGNETICALLY STABILIZED FLUIDIZED BED

Ronald E. Rosensweig, Summit, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 610,071, Sep. 3, 1975, abandoned, which is a continuation-in-part of Ser. No. 514,003, Oct. 11, 1974, abandoned. This application Apr. 11, 1977, Ser. No. 786,613

Int. Cl.[2] F26B *3/08*

U.S. Cl. 34—1 **34 Claims**



1. In a process for fluidizing a bed containing solid particulate magnetizable, fluidizable material within an external force field, wherein at least a portion of the bed containing said solid particulate magnetizable, fluidizable material and a fluidizing fluid are subjected to a nontime varying and substantially uniform applied magnetic field having a substantial component along the direction of the external force field such that said solid particulate magnetizable, fluidizable material has a component of magnetization along the direction of the external force field, the improvement which comprises continuously stably fluidizing at least a portion of said bed containing the solid particulate magnetizable, fluidizable material by a flow of a fluid opposing said external force field at a superficial fluid velocity ranging between:

(a) more than the normal minimum fluidization superficial fluid velocity required to fluidize said bed in the absence of said applied magnetic field; and

(b) less than the superficial fluid velocity required to cause time-varying fluctuations of pressure difference through said stably fluidized bed portion over a finite period of time during continuous fluidization in the presence of said applied magnetic field.

4,115,928

FREEZE-DRY PROCESS AND PRODUCT

Frank W. Reichenbacher, Scottsdale, Ariz., assignor to Armour Pharmaceutical Company, Phoenix, Ariz.

Filed Dec. 17, 1973, Ser. No. 425,599

The portion of the term of this patent subsequent to Aug. 26, 1993, has been disclaimed.

Int. Cl.[2] F26B *5/06, 5/04*

U.S. Cl. 34—5 **18 Claims**

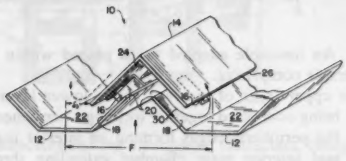
1. A method of drying unfrozen animal skin tissue compris-

ing the steps of freezing said tissue by drawing a vacuum across the tissue and thereafter lyophilizing said tissue.

4,115,929
GAS DISTRIBUTOR FOR FLUIDIZING BEDS

Fred W. Staub, and Peter A. Morgan, both of Schenectady, N.Y., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Oct. 27, 1976, Ser. No. 735,930
Int. Cl.² F26B *3/08*
U.S. Cl. 34—10 **5 Claims**



1. A gas flow distributor for fluidizing a bed of particulate material, said distributor comprising:

a plurality of base plates defining longitudinal troughs with raised side walls and arranged in longitudinal rows to form at least one slot orifice of pre-selected size between the edges of adjacent side walls;

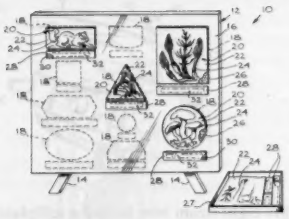
at least one deflector baffle forming a covering over said at least one orifice and said trough side wall edges;

spacing means for separating said plates and said at least one baffle, wherein said spacing means comprises at least one flexible rib supportably joining facing surfaces of said base plates and said at least one baffle and for accommodating expansion and contraction of said plates and said at least one baffle for establishing a circuitous fluid flow path between a plenum below the distributor and the bed above the distributor.

4,115,930
EDUCATIONAL TEACHING DEVICE

Charles R. Beck, 4432 Laurel Grove, Studio City, Calif. 90048

Filed Dec. 29, 1976, Ser. No. 755,227
Int. Cl.² G09B *29/00*
U.S. Cl. 35—7 R **16 Claims**



1. An improved educational teaching device, said device comprising, in combination:

a. a teaching display board of extended surface area;

b. at least one set of related units of informational material;

c. means for releasably securing each of said informational units to and positioning each of said informational units on said board;

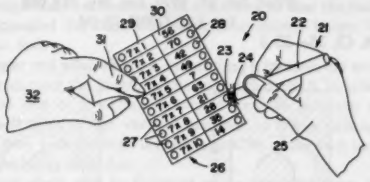
d. at least one set of related captions for each said set of informational material, each said caption bearing a first physical key, and a separate second physical key being disposed on either (a) each said caption, or (b) each said informational unit; and,

e. means for releasably securing said captions to and repositioning said captions on said board adjacent said information units to signify a relationship therewith.

4,115,931
INDIVIDUALIZED TEACHING SYSTEM UTILIZING ELECTRICAL CONTINUITY

John A. Futhey, P.O. Box 32, Petrolia, Calif. 95558

Filed Sep. 8, 1976, Ser. No. 721,538
Int. Cl.² G09B *7/06*
U.S. Cl. 35—9 C **4 Claims**



1. A device for education, amusement and the like comprising:

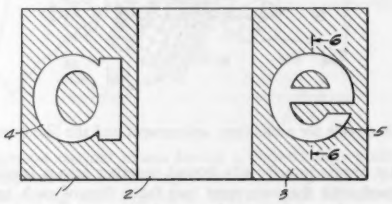
three sheets interfacially bound together into a laminated card with the outermost two faces thereof each having two columns for plural pairs of informational items with one of each pair being in a first column and the other in a second column;

adjacent to each said item, an opening through said outer card providing access to a face of an inner card, said inner card being made of electrically nonconductive material and having adhered on one face of said inner card a plurality of unconnected vertically arrayed electrically conductive ink strips, and on the other face of said inner card a plurality of unconnected horizontally arrayed electrically conductive ink strips, the number of said horizontal strips being twice the number of said vertical strips, each horizontal strip alternatively terminating in enlarged ink deposits positioned adjacent to the left edge and the right edge of said inner card and aligned with one of the aforementioned perforations in the outer sheets, preselected horizontal strips being electrically connected to preselected vertical strips via small apertures through said inner card, said apertures being filled with electrically conductive ink, said apertures being positioned in accordance with the placement of the informational items or spaces heretofore described and in such a manner that exists a plurality of distinct continuity paths from the said ink deposits adjacent to one edge of said inner card to corresponding ink deposits adjacent to the other edge of said card, said continuity paths being defined by the positions of the inked perforations, and accessibility to said continuity paths being through the perforations in the outer cards;

a hand held wireless indicator probe having a conductive probe tip enabling the user to make contact between said tip and a said enlarged ink deposit of said card, a hand contact enabling electrical contact between said probe and the user's hand which is holding the probe, visual indicator means in said probe for indicating to the user the occurrence of a completed electrical continuity circuit loop, low voltage battery power supply means in said probe connected for powering said visual indicator means, switch means connected between said battery and said indicator for switching on said indicator, switch control means connected between said hand contact and said probe contact into said switch means, said switch control means responsive to minute electrical current flow through a loop including the user's body and finger held in contact with an ink deposit being connected by a said continuity path to said ink deposit in which said probe tip is in contact, and said probe tip in electrical contact with said ink deposit, said switch control means thereupon

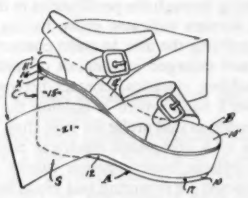
activating said switch means and thereby eliminating said visual indicator means of said probe.

4,115,932
PHONETICS SYSTEM AND METHOD OF TEACHING PHONETICS
Rita Charlesworth, 2214 22nd St., Newport Beach, Calif. 92660
Filed Jul. 15, 1977, Ser. No. 815,968
Int. Cl.[2] G09B *19/04*
U.S. Cl. 35—35 J **9 Claims**



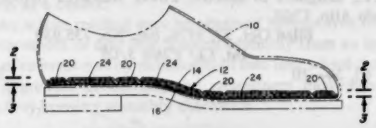
1. A phonetics system for the English language including a plurality of tiles, each tile including one or more letters that have a sound denoted by a color marking on said tile, said plurality including vowel tiles associating one color with short single vowel sounds, vowel tiles associating a second color with long single vowel sounds, digraph tiles bearing the color of vowels that commonly appear in English words with said digraph, vowel/digraph combination tiles bearing the colors associated with the sound of the vowel in said vowel/digraph combination in English words, and tiles bearing vowel combinations marked with the colors associated with the vowel sounds said vowel combinations commonly have in English words.

4,115,933
REMOVABLE SHIELD FOR FOOTWEAR
Gasper Chiaramonte, Jr., 229 Court Ave., Lyndhurst, N.J. 07071
Filed Feb. 18, 1977, Ser. No. 770,097
Int. Cl.[2] A43B *21/00, 3/24*
U.S. Cl. 36—34 B **10 Claims**



1. The combination of a wearer's shoe having a platform with surrounding upper and lower marginal anchor means of restricted channel configuration, and a replaceable laminiform cover of flexible material adapted to interfacially and conformably surround the exterior of the said platform and with upper and lower marginal beads disengageably secured in the channels of said upper and lower marginal anchor means of the platform.

4,115,934
LIQUID SHOE INNERSOLE
John M. Hall, 783 Moreno Dr., Oaji, Calif. 93023
Filed Feb. 11, 1977, Ser. No. 767,759
Int. Cl.[2] A43B *13/38*
U.S. Cl. 36—44 **3 Claims**

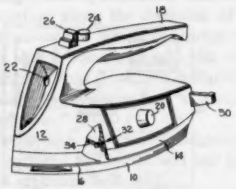


1. An innersole adapted to be placed within a shoe, said innersole comprising:

an upper layer of material and a lower layer of material being connected together forming a permanent first seal at the peripheral edges forming an interior main chamber, said interior main chamber extending throughout the length of the insole a liquid within said main chamber, said upper layer of material and said lower layer of material being constructed of a flexible plastic material; and

a second chamber surrounded by within said main chamber and in the plane thereof, the peripheral edge of said second chamber being formed by the connecting together of said upper and said lower layers of material to form a permanent second seal, the plane of said second seal being within the plane of said first seal, said second seal being formed with liquid being located within said main chamber, leakage of said liquid being prevented between said main chamber and said second chamber.

4,115,935
PLASTIC STEAM IRON
Kaj Toft, Monroe, Conn., assignor to General Electric Company, Bridgeport, Conn.
Filed May 16, 1977, Ser. No. 797,523
Int. Cl.[2] D06F *75/36*
U.S. Cl. 38—88 **6 Claims**



1. A lightweight steam iron having a soleplate and means to selectively deliver water thereto for distribution of steam therefrom, the improvement comprising

a first plastic plate above the soleplate substantially coextensive therewith and having a portion forming a skirt thereabout,

a second plastic housing having a handle and sealingly mounted on and supported by said plate,

said plate and housing forming the walls of an internal water tank and enclosing the iron operating components, and

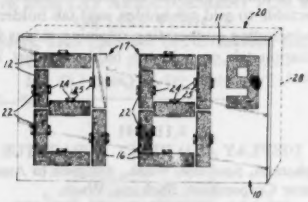
said sealing mount being disposed along all surface contacts between the plate and housing and formed to provide a portion always under compression on different rates of expansion or contraction of said plastics to form a seal therebetween at all times.

4,115,936

CHANGEABLE CHARACTER SIGN STRUCTURE

James G. Nidelkoff, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 3, 1977, Ser. No. 756,258
Int. Cl.[2] G09F 11/00
U.S. Cl. 40—449 2 Claims



1. A sign structure having changeable characters, comprising:

a plate having a patterned array of rectangular openings, said plate having front and rear surfaces, the front surface being a predetermined color;

shutters having opposite surface portions, one surface portion being the same color as the front surface of said plate and the opposite surface portion being a contrasting color, each of said shutters being rotatably mounted in one of said openings for movement between a first position presenting the one surface portion to said opening and a second position presenting the opposite surface portion to said opening; and

handle means for securing the shutters in the first or second position, said handle means comprising:

a magnetizable handle plate and flange integral with and extending from said shutter; and

a magnet disposed on opposite sides of each of said shutters proximate thereto for magnetically attracting said handle to retain said shutter and handle in said first or second positions.

4,115,937

DISPLAY FRAME

Stanley Wolpert, Syosset, N.Y., assignor to Loomskill, Inc., New York, N.Y.

Filed Jan. 6, 1977, Ser. No. 757,255
Int. Cl.[2] G09B 25/00
U.S. Cl. 35—55 4 Claims

1. A display frame for mounting of a swath of cloth behind a marked transparent overlay sheet so as to display the mounted cloth in the form of a garment worn by a pictured model comprising

an open frame bounded by a pair of spaced vertical members each joined to a base pedestal and joined together by spaced horizontal means,

a hangar rod mounted to the vertical members so as to extend between said vertical members, with

each vertical member formed with a through slot extending a substantial length of the said vertical member, said vertical members each fitted with means to detachably clamp a side edge of a swath of cloth in a said slot so that the swath is suspended between the vertical members below the hangar rod,

said hangar rod adaptable for suspending a transparent overlay sheet over the length of the suspended cloth, in which

each said slot of a vertical member extends between the opposed sides of the vertical member so that a common plane may pass through the through slots of the two vertical members, such that

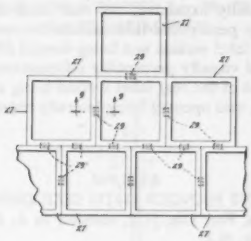
a swath of cloth may be fastened in, or removed from, the frame sidewise through the said slots independently of the suspended overlay, and the overlay may be replaced independently of the suspended swath.

4,115,938

VARIABLE PICTURE FRAME ASSEMBLY

Harold M. Belmuth, Westport, Conn.; Alfred R. Leto, Springfield, Mass.; Lawrence London, Norwalk, and Herman A. Zuckerman, Westport, both of Conn., assignors to Saugatuck Industries, Incorporated, Westport, Conn.

Filed Dec. 22, 1976, Ser. No. 753,287
Int. Cl.[2] G09F 1/12
U.S. Cl. 40—152 6 Claims



1. A variable picture frame assembly comprising:

(a) a plurality of picture frames, each of said picture frames having a front wall having an opening to expose a picture mounted within the frame and a plurality of side walls along the front wall along the periphery thereof and extending rearwardly therefrom, each side wall including an inside surface and an outside surface, a lip formed on the inside surface of each side wall adjacent a back edge thereof extending along said back edge; and

(b) connecting means for joining adjacent picture frames together, said connecting means comprising snap-on type removal clips, each clip including a pair of spaced leg portions containing a transversely extending bead adapted to fit over the lips on the inside surface of side walls of the adjacent frames to join the frames together.

4,115,939

BOTTLE WITH A MULTIPLE PART LABEL

Cedric Marks, 880 Fifth Ave., New York, N.Y. 10021

Filed Oct. 4, 1976, Ser. No. 729,172
Int. Cl.[2] G09F 3/00
U.S. Cl. 40—310 1 Claim

1. A package construction comprising a bottle of light-

permeable material, a light-permeable liquid in said bottle, and front and rear label sections on opposed sides of said bottle to be viewed in cooperative relation, at least one of said label sections including a field at least in part distorted to compensate for optical distortion of the rear label section due to refraction of the bottle and liquid, the rear label section having visually perceptible information thereon facing towards the front label section, said information being distorted to compensate for said optical distortion, the front label section being provided with an opening through which the rear label section

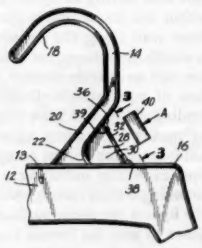
is viewed, said bottle being generally cylindrical, the information in the field of the rear label section being compressed in lateral direction to compensate for optical distortion, the opening being laterally expanded, the rear label section further having visually perceptible information thereon facing away from the front label section and being devoid of the distortion of the first said visually perceptible information; the information in the field of the rear label section being compressed by about 40–60%, said opening being laterally expanded by about 10–20%.

4,115,940

GARMENT HANGER WITH SIZE INDICATOR

Robert Phillips, Fort Lee, N.J., assignor to A. & E. Warbern, Inc., Keasbey, N.J.

Filed Jul. 29, 1977, Ser. No. 820,267
Int. Cl.[2] G09F *3/00*
U.S. Cl. 40—322 **9 Claims**



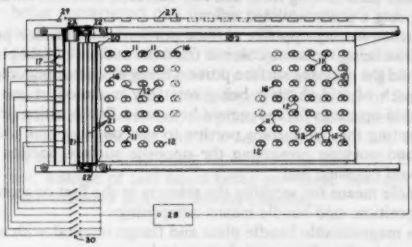
1. A garment hanger comprising a body, a hook member formed integrally with said body and being joined to said body at one end of said hook member, a tab holder formed integrally with said body and said hook member and being connected to both said body and said hook member substantially at the junction of said body and hook member thereby forming an integral, one piece structure of said body, hook member and tab holder, said tab holder being oriented substantially in the direction of a plane formed by said body and said hook member, said tab holder extending for a finite distance along an edge of said body and along an edge of said hook member and being further defined by a free edge extending between the terminus of the extent of said tab holder along said edge of said body and the terminus of the extent of said tab holder along said edge of said hook member and an information tab removably connectable to said tab holder, said tab holder and information tab including cooperating retaining means for holding said information tab on said tab holder against inadvertent dislodgement.

4,115,941

DISPLAY AND RESET APPARATUS

Lorne Stephenson, Spokane, Wash., assignor to American Sign & Indicator Corporation, Spokane, Wash.

Filed Mar. 7, 1977, Ser. No. 774,887
Int. Cl.[2] G09F *9/30*
U.S. Cl. 40—452 **5 Claims**



1. In an information display device having:
an upright panel with a plurality of discrete light-transmitting areas arranged along transversely spaced upright columns and surrounded by a background;
a backing member spaced parallel to the panel;
a plurality of circular disks equal in number to the number of light-transmitting areas on the panel, each disk having a diameter capable of overlying an associated light-transmitting area;
means individually mounting each disk within the space separating said panel and said backing member for selective coplanar movement between alternate stable positions in relation to its associated light-transmitting area, namely a first position in which the disk overlies its associated light-transmitting area, and a second position in which it is clear thereof;
and carriage means mounted rearward of the backing member for permitting relative movement between the panel and said carriage means in a continuous sweep;
the improvement comprising:
first and second disk operating means on said carriage means for sequentially exerting inductive forces on each disk operatively encountered thereby during a continuous sweep of the panel relative to said carriage means;
said first disk operating means being positioned on said carriage means relative to the position of said second disk operating means so as to lead said second disk operating means during each sweep of the panel, said first disk operating means being operable to preset each disk in one of said alternate positions prior to its operative encounter by said second disk operating means;
said second disk operating means being operable to move selected individual disks operatively encountered thereby from said one position to their remaining alternate positions

one of said disk operating means comprising a column of disk operators in fixed positions on the carriage means;

the remaining one of said disk operating means comprising a drum rotatably mounted to said carriage means about an axis parallel to said column of disk operators.

4,115,942

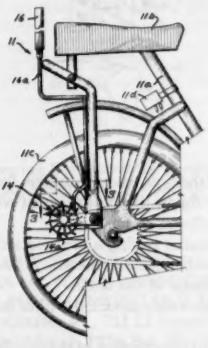
MESSAGE DISPLAY ARRANGEMENT FOR BICYCLE OR LIKE VEHICLE

Ernest L. Sears, 5111 Elmhurst Dr., Evansville, Ind. 47711

Filed Feb. 17, 1977, Ser. No. 769,651

Int. Cl.[2] B60Q *11/00;* **G09F** *11/23*

U.S. Cl. 40—547 **4 Claims**



1. A message display arrangement for a bicycle having a wheel-supported framework comprising light producing means mounted on said framework, a rotatable indicia carrying segment wheel mounted on a portion of said framework adjacent to said light producing means and positioned to pass light through said indicia, a message display unit mounted on said framework, and a system of fiber optic strands extending from the side of the segment wheel opposite to said light producing means to said message display unit transmitting light which passes through said indicia on said segment wheel to said message display unit, where a projection on a bicycle wheel selectively and intermittently engages one of a series of pins extending from said indicia carrying segment wheel to rotate the latter, said movement of said bicycle wheel providing a continual message on said message display unit.

4,115,943

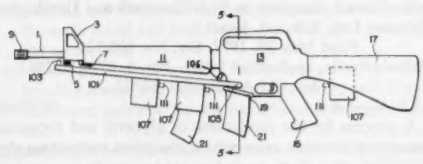
RESERVE MAGAZINE HOLDER

Daniel D. Musgrave, 8201 Caraway St., Cabin John, Md. 20731

Filed May 31, 1977, Ser. No. 801,641

Int. Cl.[2] F41C *27/00*

U.S. Cl. 42—90 **4 Claims**



1. A frame arranged for attachment to a firearm having a stock and a detachable magazine adapted for installation at a feeding position on said firearm said frame including: means for storing said magazine at a non-feeding position separate from said feeding position, quickly releasable detent means capable of retaining said magazine at said non-feeding position and insulating means for shielding a magazine stored at said non-feeding position from heat emanating from a barrel of said firearm.

4,115,944

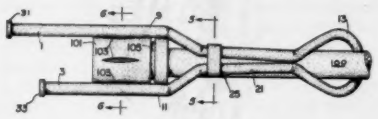
BALLISTIC CUTTERS

Daniel D. Musgrave, 8201 Caraway St., Cabin John, Md. 20731

Filed Nov. 25, 1977, Ser. No. 854,819

Int. Cl.[2] F41C *27/00*

U.S. Cl. 42—90 **5 Claims**



1. A ballistic cutter comprising: means adapted for engagement with a barrel of a firearm near a muzzle thereof; a pair of members extending from said means, each of said pair terminating in a windlassing lug; wedge means on each of said pair positionally adapted for engagement with a slot in a device affixed to said muzzle; and means for retaining said wedge means in said engagement whereby said cutter can be mounted with each said lug protruding beyond said device.

4,115,945

TRAP SETTER FOR BEAVER TRAPS

Clarence B. Hession, and Dorothy Hession, both of 1107 Franklin St., Hattiesburg, Miss. 39401

Continuation-in-part of Ser. No. 776,832, Mar. 14, 1977. This application Mar. 28, 1977, Ser. No. 781,635

Int. Cl.[2] A01M *23/28*

U.S. Cl. 43—97 **1 Claim**

1. An improvement in an apparatus for setting beaver-type animal traps of the type having at least one V-shaped closing spring unit, said unit having normally divergent spring-based arms provided at free ends with slideable jaw encircling eyes, said apparatus having a tubular frame having an elongated slot on one side, and having one hook fixed to said tubular frame, and having one hook attached to a movable rod protruding through and into said tubular frame. wherein the improvement comprises:

a. said fixed hook upwardly pointing in operation and attached to the lower end of said frame at the lower end of said elongated slot;

b. said hook attached to said movable rod is downwardly pointing in operation and attached to said movable rod by swivel means;

c. said movable rod having ratchet teeth; and

d. ratchet means, attached to the upper end of said frame for applying great mechanical advantage to said movable

ratchet rod and providing for selectably forcibly advancing and slideably retrieving said ratchet rod through said frame.

4,115,946

FLEXIBLE DISCUS DEVICE

Daniel Vukmirovich, 9233 Bedford, Detroit, Mich. 48224

Continuation-in-part of Ser. No. 730,179, Oct. 7, 1976, abandoned. This application Jan. 17, 1977, Ser. No. 759,783

Int. Cl.[2] A63H *33/18*

U.S. Cl. 46—74 D **14 Claims**

1. A device comprising a disc-shaped section of flexible, non-resilient sheet material having an edge section with an extension in a direction normal to the nominal plane of the disc when the sheet and edge section are extended, and an annular distributed weight formed of a material having a density substantially in excess of the sheet material connected to said laterally extending edge, whereby the device may be readily folded or crumpled, and when hurled with a rotational motion the centrifugal forces acting on the weights will cause the device to assume an extended position so as to exhibit aerodynamic properties.

4,115,947

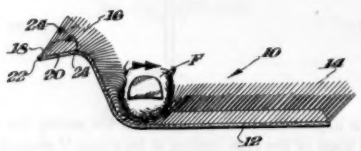
ACTION TOY AND AMUSEMENT DEVICE

Joseph A. Giordano, 213 S. Gray Ave., Colonial Heights, Wilmington, Del. 19805

Filed Aug. 31, 1976, Ser. No. 719,267

Int. Cl.[2] A63H *3/02*

U.S. Cl. 46—116 **1 Claim**



1. A method of making and manipulating an action toy and amusement device comprising cutting a thin strip of rug material having upstanding nap material extending generally perpendicular to a stiff flexible backing member to a size about eight times longer in length than in width and of a width narrower than the length of the user's finger, cutting opposite sides of one end of the strip to form a pointed end, forming simulated eyes on the pointed end to form a simulated head thereby, and stroking the strip with the user's finger from an upstream direction to a downstream direction in its longitudinal direction while the strip is on a support surface to bend the nap material toward the horizontal and toward the backing member in the direction of stroke thereby causing the nap material to raise the upstream backing material to result in the strip moving up and down with respect to the support surface.

4,115,948

DRINKING DOLL HAVING WETTING AND NON-WETTING MODES

Lucile Burks, 5906 Oxley Dr., Flint, Mich. 48504

Filed Nov. 10, 1976, Ser. No. 740,595

Int. Cl.[2] A63H *13/02*

U.S. Cl. 46—141 **5 Claims**

1. In a toy doll of the type having a system for simulating the elimination of body fluids, the improvement which comprises:

(a) an opening defining a mouth,

(b) a first flow conduit having a first end secured about and in registry with the opening, the first flow conduit extending into the interior of the doll,

(c) a reservoir removably mounted within the interior of the doll,

(d) means at the exterior surface of the doll for removing the reservoir from the interior of the doll.

(e) a second flow conduit disposed within the doll having a first end in flow communication with a second exterior opening formed in the doll, the second end being proximate the second end of the first flow conduit, and

(f) means for detachably interconnecting the reservoir, the second end of the first flow conduit and the second end of the second flow conduit, the interconnecting means being selectively connectable to the reservoir and last mentioned flow conduit ends in a first mode wherein liquid entering the mouth bypasses the second conduit and flows into the reservoir, and in a second mode wherein liquid entering the mouth bypasses the reservoir and flows through the second exterior opening.

4,115,949

PRODUCTION OF GLYCEROL FROM ALGAE

Mordhay Avron, Rehovot, and Ami Ben-Amotz, Ramat Gan, both of Israel, assignors to Yeda Research and Development Company Ltd., Rehovot, Israel

Filed May 25, 1977, Ser. No. 800,521

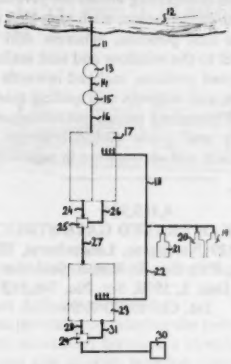
Claims priority, application Israel, Jun. 6, 1976, 49726

Int. Cl.[2] A01G *7/00, 33/02*

U.S. Cl. 47—1.4 **16 Claims**

1. A process for the production of glycerol and proteinous substances of nutritive value which comprises cultivating algae species of the *Dunaliella* genus in a nutrient medium containing the mineral requirements of growth of the algae, said nutrient medium having a sodium chloride content of at least 1.5 M, the cultivation being effected while an adequate supply of carbon dioxide is provided and continued until a maximum concentration of algae is obtained, and continuing the cultivation of the algae in a nutrient medium having a content of sodium chloride

of at least 3 M, cultivating the algae in this second nutrient medium until a high glycerol content is established, harvesting



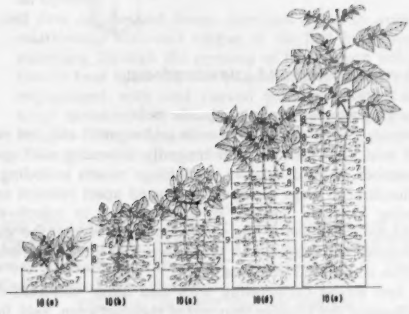
the algae, recovering from same the glycerol, and recovering the residue having a high protein content.

4,115,950

METHOD OF INCREASING THE YIELD IN THE CULTIVATION OF TUBER-PRODUCING PLANTS AND A DEVICE FOR CARRYING OUT THE METHOD

Kälmän Lantai, Götatan 4[II], 752 22 Uppsala, Sweden

Filed Mar. 1, 1976, Ser. No. 662,936
Claims priority, application Sweden, Mar. 6, 1975, 7502498
Int. Cl.[2] A01G *1/00*
U.S. Cl. 47—58 **6 Claims**



1. A method for increasing the yield in the cultivation of tuber-producing plants comprising the steps of:

(a) planting a seed-tuber in a first box-like frame unit;

(b) adding a new layer of soil in said first frame unit to cover the embryonal axil buds formed as the plant grows from the seed-tuber;

(c) placing a second box-like frame unit on top of said first box-like frame unit when the soil added to said first box-like frame unit reaches the top of said first box-like frame unit;

(d) adding layers of soil in said second box-like frame unit to cover the embryonal axil buds formed as the plant grows; and

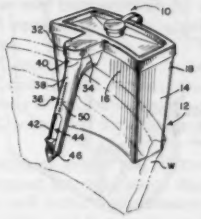
(e) adding additional box-like frame units one on top of the other as the plant grows, each time covering the embryonal axil buds with new layers of soil in said frame units as said plant grows until the pile of soil formed reaches a given height.

4,115,951

APPARATUS FOR SUPPLYING FLUIDS TO POTTED PLANTS

Joseph T. Becker, 2 S. 214 Sheffield Rd., Glen Ellyn, Ill. 60137, and Byron L. Doran, 1725 LaPalma Ct., Wheaton, Ill. 60187

Filed Nov. 1, 1976, Ser. No. 737,702
Int. Cl.[2] A01G *27/00, 29/00*
U.S. Cl. 47—81 **1 Claim**

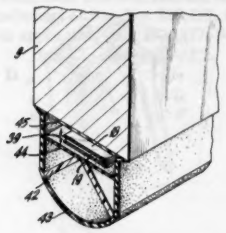


1. A plant watering apparatus adapted to provide a continuous supply of water to soil within a soil and plant containing receptacle, and to be readily removable from said soil and receptacle without disturbance thereof for periodic adjustment of said apparatus to control the rate of water flowing therthrough to said soil in said receptacle, said apparatus comprising, in combination, a water reservoir portion including a reservoir body and a cover unit for said reservoir body, a soil probe unit having a probe body consisting of a straight, generally cylindrical, rigid tube having upper, lower and intermediate portions, and having the lower portion thereof closed off by a pointed nose element extending from said lower body portion along the axis of said tubular body, an axially extending, wick receiving passage forming the inner diameter of said straight, cylindrical soil probe body, a probe neck portion joined at one part thereof to said upper portion of said soil probe body and at another part thereof to an upper portion of said water reservoir, said probe neck portion also including an interior passage providing communication between the interior of said reservoir body and said passage in said probe body, said upper and intermediate portions of said probe body and said probe neck being imperforate above the level of the soil in said receptacle when said apparatus is in position of use, a wick disposed within said apparatus and extending, in position of use, from said reservoir body through said passage in said probe neck and throughout substantially the entire length of said passage in said probe body, said probe further including a generally radially outwardly facing, axially extending moisture flow opening in the lower portion thereof, and a slide unit covering part of said mositure flow opening and arranged for adjustable movement axially of said probe body between a plurality of positions, including a relatively open position and another position in which a substantial portion of said moisture flow opening is closed off, means for retaining said slide in a selected one of said plurality of positions, said generally cylindrical, axially extending, wick receiving passage includes a lower portion tapering inwardly toward the lower portion of said probe so as to form a wick receiving probe passage of a gradually reducing cross section, said tapering portion being situated in the vicinity of said moisture flow opening, whereby movement of said slide toward a closed off position of said opening tends to pinch said wick against the surface of said wick receiving passage with increasing force, thereby pinching said wick into a condition of reduced moisture flow when said slide is moved toward said position closing off said moisture flow opening, said probe neck having means forming a part thereof for support by engaging a portion of said soil and plant containing receptacle, whereby said apparatus may be repeatedly removed from and inserted into said soil and plant containing receptacle for movement of said slide unit between different positions of said adjustment to provide varying rates of water flow from said reservoir to said soil.

4,115,952
SAFETY DOOR EDGE

Harlan S. French, Phillipsburg, N.J., assignor to American Can Company, Greenwich, Conn.

Filed Mar. 2, 1977, Ser. No. 773,496
Int. Cl.[2] E05F 15/02
U.S. Cl. 49—26 4 Claims

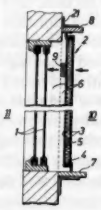


1. A fail-safe door safety closing system including a door frame, a door movably mounted in said door frame and movable into an open and a closed position, a control means to generate a control signal, a door operating means having an independent first power source to open said door upon receiving a control signal from said control means, said door having a safety edge means which is movable against said door frame in said closed position, said edge means including first and second conductive ribbon means, each of said ribbon means having first and second terminals separated by a length of conductive ribbon, said ribbons being normally separated and contacting each other upon an edge striking an obstruction, an active circuit comprising second power source means to provide electrical power to said active circuit and a relay means having a coil with first and second terminals, relay contacts and a movable member which closes said relay contacts when the relay is energized and opens said relay contacts when the relay is de-energized, the first relay terminal being connected to the first terminal of the first ribbon means and the second relay terminal being connected to the first terminal of the second ribbon means, said second terminals of both said ribbon means being connected in series with said second power source, said relay contacts when closed operating said control means and starting the operation of said door operating means to close the door, said contacts when open de-energizing said control means so that said door operating means opens said door, wherein said relay coil is shorted by the contacting of said ribbons and said relay is de-energized upon failure of the active circuit, thereby opening said door upon active circuit failure.

4,115,953
SELF SEALING HEAT INSULATING SHUTTER SYSTEM

Karl Hilding Brosenius, Stockholm, Sweden, assignor to Tekram Associates, North Haven, Conn.

Filed Jul. 11, 1977, Ser. No. 814,188
Int. Cl.[2] E05D 15/26
U.S. Cl. 49—125 25 Claims

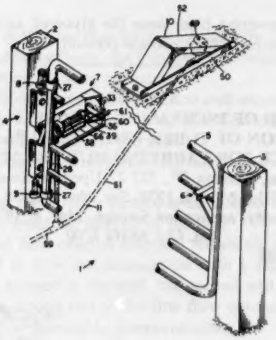


1. A heat insulating shutter system for use on a window or the like comprising a plurality of insulating shutter sections, guide means mounted above said shutters, means for movably mounting said sections to said guide means and means for air sealing the space between the window and the shutter sections, said mounting means comprising means for pivotally mounting said sections to said guide means, such that said sections may be pivoted from a first position, wherein said sections are substantially parallel to the window and said sealing means are engaged, and a second position, inclined inwards with respect to said first position, and wherein said sealing means are disengaged, said pivotal mounting means permitting movement of said sections along said guide means between opened and closed positions, when said sections are in said second position.

4,115,954
REMOTELY OPERATED GATE STRUCTURE

Mark E. Larkin, 419 Northgate, Lindenhurst, Ill. 60046, and Michael H. King, P.O. Box K, R.R. 3, Scottsburg, Ind. 47170

Filed Dec. 1, 1976, Ser. No. 746,512
Int. Cl.[2] E05D 7/06
U.S. Cl. 49—240 21 Claims

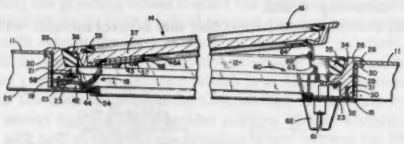


1. A remotely operated gate comprising:
(a) a support;
(b) a gate member having opposite ends;
(c) hinge means cooperating with said support and one end of said gate member and hingedly mounting said gate member on said support, said hinge means including a plurality of hinge members in spaced apart relation and being movable relative to one another to selectively change the plane of the gate member whereby the gate member will move under the influence of gravity between open and closed positions;
(d) first means cooperating with said hinge members for effecting the relative movement therebetween, said first means including motive means with at least a portion thereof remote from said support and actuator means operably connected to said hinge means, said motive means being operably connected to said actuator means by an energy transmitting member which when transmitting energy is substantially immovable whereby operation of said motive means effects operation of said actuator means effecting the relative movement of said hinge members for effecting changing the plane of the gate member whereby said gate member moves between the open and closed positions; and
(e) force applying means operably associated with said gate member, said force applying means including a movable member cooperating with said gate member and said actuator means whereby when said actuator means effects relative movement of said hinge members, said movable member is moved for applying force to said gate member to help start opening movement of said gate thereby assisting gravity induced opening movement.

4,115,955
PANEL AND HINGE ASSEMBLY

Darrell L. Aldrich, 800 Park Dr., Owatonna, Minn. 55060

Filed Aug. 1, 1977, Ser. No. 820,634
Int. Cl.[2] E05D 15/58; B60J 7/18
U.S. Cl. 49—261 16 Claims

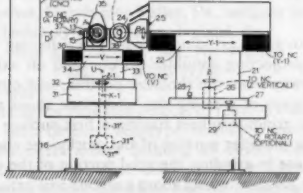


1. A panel and hinge assembly comprising:
a panel unit;
frame means defining an opening;
hinge means pivotally connecting the panel unit to the frame means for movement between a closed position covering the opening and an open position clear of the opening;
said hinge means including at least one hinge assembly;
said hinge assembly having a first hinge member and a second member;
one hinge member being connected to the panel unit and the other to the frame means;
said first hinge member having an arcuate shoulder and a tongue extended away from the shoulder providing bearing surfaces for the first hinge member located on opposite sides of the first hinge member from one another to be orientated to face in generally opposite directions;
said second hinge member having an arcuate yoke portion and a curved platform providing bearing surfaces for the second hinge member located on opposite sides of the second hinge member from one another to be orientated to face in generally opposite directions;
the arcuate yoke portion of the second hinge member having an opening;
said first and second hinge members being in assembled relationship with said tongue of the first hinge member extending through the opening of the arcuate yoke portion to bear upon the curved platform in sliding bearing engagement with said curved platform of the second hinge member, said shoulder of the first hinge member being in sliding engagement with the arcuate yoke portion of the second hinge member.

4,115,956
PROGRAMMABLY CONTROLLED MACHINE FOR GRINDING END CUTTING TOOLS AND THE LIKE

Stanley E. Huffman, Clover, S.C., assignor to S. E. Huffman Corporation, Clover, S.C.

Filed Jun. 28, 1977, Ser. No. 810,776
Int. Cl.[2] B24B 3/08
U.S. Cl. 51—96 14 Claims



1. A numerically controlled (N/C) grinding machine for grinding a workpiece such as a cutting tool at one station while the workpiece remains fixed with respect to and in the same holder as the holder rotates and all grinds thereon are made with a grinding wheel and are programmably defined, located and executed by N/C servomotor positioning of said workpiece and wheel with reference to three mutually perpendicular fixed intersecting axes designated X, Y, Z, and other axes positioned in reference thereto, comprising in combination:
(a) a base structure;
(b) a grinding wheel support system including:
(i) a rotary vertically extending support structure mounted on said base structure for arcuate movement about and vertical movement parallel to a first fixed vertical axis;
(ii) first N/C servomotor means for linear vertical positioning of said vertical support structure incrementally, independently of and simultaneously with positioning of other N/C positioning servomotor drive means of said machine;
(iii) first positioner means for rotative positioning said vertical support structure about said first vertical axis and fixing such vertical support structure in a selected arcuate position, said first positioner means being operable incrementally, independently of and simultaneously with positioning of other N/C positioning servomotor means of said machine;
(iv) a first slide mounted on said vertical support structure above said base structure and movable vertically and rotatively therewith, said first slide being positionable on a second horizontal linear axis perpendicular to said first vertical axis;
(v) second N/C servomotor means for linear positioning said first slide on said second axis incrementally, independently of and simultaneously with positioning of other N/C positioning servomotor means of said machine;
(vi) rotary support means mounted at one end of said first slide and rotatably positionable about a third horizontal axis fixed parallel to said second axis;
(vii) third N/C servomotor means for rotatively positioning said rotary support means with respect to said third axis incrementally, independently of and simultaneously with positioning of other N/C positioning servomotor means of said machine;
(viii) a variable speed grinding wheel drive motor fixedly mounted on said rotary support means with the longitudinal axis thereof, a fourth axis, fixed perpendicular to said third axis and positionable therewith around said third axis;
(ix) motor control means enabling the energization and speed of said motor to be controlled independently of and simultaneously with positioning of other N/C positioning servomotor means of said machine; and
(x) a grinding wheel mounted on one end of a spindle and driven by said grinding wheel drive motor about said fourth axis;
(c) a workpiece support system including:
(i) a second slide mounted on said base structure and positionable on a fifth horizontal fixed linear axis;
(ii) fourth N/C servomotor means for linear positioning said second slide incrementally, independently of and simultaneously with positioning of other N/C positioning servomotor means of said machine;
(iii) rotary table means rotatably mounted on and above said second slide for rotation around a sixth vertical axis which sixth axis is in turn positioned linearly on said fifth axis as said second slide is positioned thereon;
(iv) fifth N/C servomotor means for rotatively positioning said rotary table means about said sixth vertical axis incrementally, independently of and simultaneously with positioning of other N/C positioning servomotor means of said machine;
(v) a third slide secured to and above said rotary table means and rotatably positionable therewith about said sixth vertical axis, said third slide being positionable on

a seventh horizontal linear axis perpendicular to said sixth axis;

(vi) sixth N/C servomotor means for linearly positioning said third slide on said sixth horizontal axis incrementally, independently of and simultaneously with positioning of other N/C positioning servomotor means of said machine;

(vii) a fourth slide secured to and above said third slide and rotatably positionable therewith about said sixth vertical axis, said fourth slide being positionable on an eighth horizontal linear axis fixed perpendicular to said seventh horizontal axis;

(viii) seventh N/C servomotor means for linearly positioning said fourth slide on said eighth horizontal axis incrementally, independently of and simultaneously with positioning of other N/C positioning servomotor means of said machine;

(ix) a holder assembly for a workpiece such as a cutting tool, including workpiece holding means enabling the workpiece to be positioned about an axis extending therethrough, a ninth axis;

(x) eighth N/C servomotor means for rotatively positioning said workpiece holding means about said ninth axis incrementally, independently of and simultaneously with positioning of other N/C servomotor means of said machine;

(xi) mounting means for said assembly and eighth N/C servomotor means secured to and above said fourth slide for arcuate positioning of said tool holding means and the workpiece held therein about a tenth horizontal axis extending through said mounting means and perpendicular to said ninth axis; and

(xii) second positioner means for arcuate positioning of said holding means about said tenth axis and fixing said holding means in a selected arcuate position, incrementally, independently of and simultaneously with positioning of other N/C positioned servomotor means of said machine; and

(d) numerical control means including programming means defining, locating and controlling the execution of each grind on said workpiece and the speed of said wheel according to the edge or surface comprising the same and including N/C means operating said N/C servomotor means for N/C positioning of said workpiece and wheel relative to at least said first axis, vertically, said second axis linearly, said third axis rotatively, said fifth axis linearly, said sixth axis rotatably, said seventh axis linearly, said eighth axis linearly, and said ninth axis rotatively wherein all of said grinds may be completed precisely and in a series of consecutive grinding and positioning operations which may proceed in an uninterrupted sequence incrementally, independently and simultaneously throughout the grinding operation.

4,115,957

BELT CENTERING AND REPLACEMENT MECHANISM FOR BELT SANDERS AND THE LIKE

Chris H. Porth, Palatine, and E. Harold Lilja, Arlington Heights, both of Ill., assignors to Skil Corporation, Chicago, Ill.

Filed Sep. 28, 1977, Ser. No. 837,470
Int. Cl.[2] B24B *21/18, 23/06*
U.S. Cl. 51—170 EB **10 Claims**

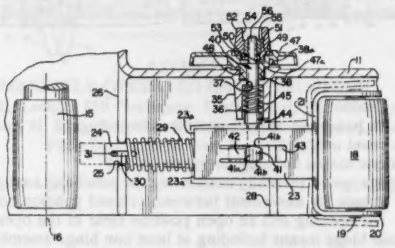
1. In a belt-type abrading, burnishing or polishing device of the type having a housing, a driving motor, drive and idler rollers rotatable about generally parallel axes, wherein the drive roller is driven by said motor, and a belt entrained over said drive and idler rollers, the improved belt centering and replacement mechanism comprising:

(a) mounting means supporting said idler roller from said housing for swinging movement in a plane containing the axes of both of the drive and idler rollers and for shifting movement along a path generally toward and away from the drive roller;

(b) a control member mounted by said housing for compound movement in first and second different modes;

(c) first means connecting said control member with said mounting means such that movement of the control member in said first mode causes swinging movement to the mounting means;

(d) second means connecting said control member with said



mounting means such that movement of the control member in said second mode imparts shifting movement of the mounting means for moving said idler roller toward said drive roller;

(e) a manually operated belt centering member connected with said control member for moving the same in said first mode; and

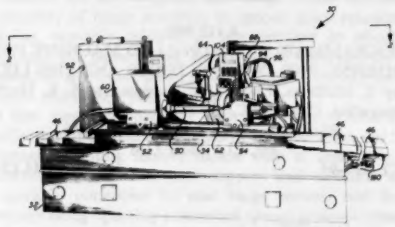
(f) a manually operated belt replacement member also connected with said control member for moving the same in said second mode.

4,115,958

METHOD OF CYLINDRICAL AND SHOULDER GRINDING

Gary E. Englander, Shrewsbury; Richard P. Chase, Spencer; Donald P. Anderson, Prinston, and Guy D. Metcalf, West Boylston, all of Mass., assignors to The Warner & Swasey Company, Cleveland, Ohio

Filed Feb. 18, 1977, Ser. No. 769,945
Int. Cl.[2] B24B *1/00*
U.S. Cl. 51—289 R **45 Claims**



1. A method of grinding a workpiece having a radially outwardly projecting shoulder portion and an axial portion extending away from the shoulder portion, said method comprising the steps of rotating the workpiece about a first axis, providing a grinding wheel having a first surface for use in grinding the shoulder portion of the workpiece and a second surface for use in grinding the axial portion of the workpiece, rotating the grinding wheel about a second axis extending at an acute angle to the first axis, effecting relative movement between the rotating grinding wheel and the rotating workpiece through a first work stroke, engaging the axial portion of the workpiece with the second surface on the grinding wheel during the first work stroke, moving the grinding wheel

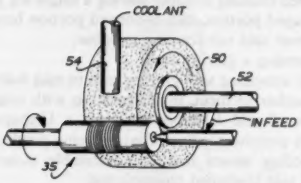
toward the first axis along a path extending at an acute angle to the first axis after completing the first work stroke, said step of moving the grinding wheel toward the first axis being effective to move the first surface on the grinding wheel toward the shoulder portion of the workpiece, compensating for the extent of movement of the first surface on the grinding wheel toward the shoulder portion of the workpiece during said step of moving the grinding wheel toward the first axis by initiating movement of the grinding wheel toward the first axis from a position in which the first surface of the grinding wheel is offset from the plane of a radially extending surface of the shoulder portion by a distance which is at least substantially equal to the distance which the first surface on the grinding wheel moves toward the shoulder portion of the workpiece during said step of moving the grinding wheel toward the first axis, effecting relative movement between the rotating grinding wheel and the rotating workpiece through a second work stroke after completing said step of moving the grinding wheel toward the first axis.

4,115,959

METHOD FOR INCREASING THE LIFE OF SILICON CARBIDE GRINDING WHEELS

Harold E. McCormick, Ballwin, Mo., assignor to Ramsey Corporation, St. Louis, Mo.

Filed Jan. 31, 1977, Ser. No. 763,831
Int. Cl.[2] B24D *3/24*
U.S. Cl. 51—295 **15 Claims**



1. A method for increasing the life of silicon carbide grinding wheels used in manufacturing an article and which comprises forming a bearing surface on a metallic substrate by plasma spray applying a powder containing from 8.5 by weight to 22.5% by weight of titanium dioxide; from 76.5 by weight to 67.5% by weight of aluminum oxide, and from 10 to 15% by weight of a metal fluoride, said titanium dioxide, aluminum oxide and metal fluoride constituting at least 91.5% of said powder, said metal fluoride being selected from the group consisting of alkaline earth metal fluorides and mixtures of alkaline earth metal fluorides, cooling said coated metal substrate; and grinding said coating with a silicon carbide grinding wheel to smooth said surface, whereby the life of said silicon carbide grinding wheel is increased.

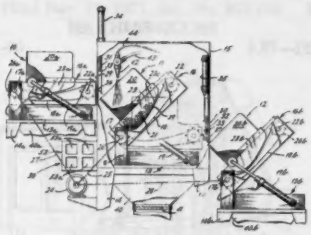
4,115,960

METHOD AND APPARATUS FOR DEFLASHING

Robert F. Zecher, Huntingdon Valley, Pa., assignor to Advanced Plastics Machinery Corporation, Ivyland, Pa.

Filed Apr. 28, 1977, Ser. No. 791,726
Int. Cl.[2] B24B *31/00*
U.S. Cl. 51—422 **17 Claims**

1. In apparatus for tumbling objects to remove flash from the surfaces of such objects: belt-type conveyor means having associated therewith means defining an object loading zone and an object discharge zone; drive means for advancing said conveyor means in one direction past said loading zone and toward said discharge zone during tumbling and discharging operations; guide means forming a portion of said conveyor means into a shaped contour surface upwardly sloped in the direction of advance of said portion of the conveyor means for causing substained tumbling of objects upon said surface during the tumbling operation; and means for effecting movement of at least said portion of said conveyor means between a first, upper, loading position providing for tumbling of objects upon



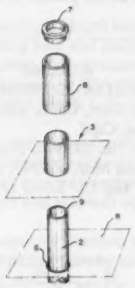
the conveyor means, and a second, lower position in which said objects are discharged from said discharge zone under the influence of the advancing movement of the conveyor means in said direction.

4,115,961

VENT COVER

Robert L. Bishop, Ballwin, Mo., assignor to West County Supply & Mfg. Co., Inc., Ballwin, Mo.

Filed Jul. 28, 1977, Ser. No. 819,981
Int. Cl.[2] E04D *13/08*
U.S. Cl. 52—58 **13 Claims**



1. A vent cover for a plumbing installation and for use in preventing element leakage around a vent pipe formed of an expandable material and its flashing as formed from a material having a different coefficient of expansion than the said vent pipe, both said cover and pipe normally being disposed upon a roof structure, with the vent pipe being of the type that normally projects through its accompanying flashing, comprising, a sleeve having an internal diameter greater than the external diameter of the flashing and when disposed therearound capable of independent movement without obstruction therefrom, an adapter connecting with the upwardly disposed end of said sleeve and capable of attachment with the upper end of the vent pipe, said adapter including a shoulder being of a size to accommodate the upper end of the said vent pipe in mating engagement, said adapter having an opening therethrough and being of the same diameter as the internal diameter of the vent pipe upon which it mounts so as to provide no obstruction to the discharge of vent gases to the atmosphere, said adapter extending only a short distance above the vent pipe upon which it mounts, and said sleeve and adapter disposed for simultaneous movement with the expansion of the said vent pipe and shrouding the upper end of the flashing while being out of contact therewith for preventing the leakage of any elements therearound.

4,115,962

PREFABRICATED BUILDING STRUCTURE

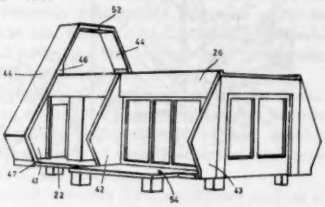
Ronald Caisley, Mansfield, Canada (L0N 1M0)

Filed Nov. 15, 1976, Ser. No. 742,312

Claims priority, application United Kingdom, Nov. 14, 1975, 47064/75

Int. Cl.[2] E04H *1/00*

U.S. Cl. 52—79.4 **8 Claims**



1. A building structure comprising a core having a base defining a rectangular ground floor, a pair of end walls extending upwardly from respective opposite sides of the ground floor, a bridge extending between and supported by the end walls, the bridge being a structural member and defining an upper floor above the ground floor; panel means coupled to the base and to the bridge to provide additional ground floor and to protect the sides of the ground floor and of the upper floor between the end walls, said panel means including upper portions inclined upwardly and over the upper floor and top portions extending from the respective upper portions to meet other such top portions above the upper floor and said panel means being coupled to the bridge at the upper inclined portions.

4,115,963

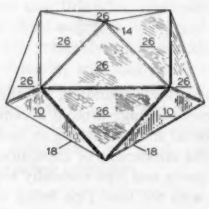
BUILDING MODULE

Donald S. Lubov, San Jose, Calif., assignor to Georight Industries, Inc., San Jose, Calif.

Continuation of Ser. No. 591,012, Jun. 27, 1975, abandoned. This application Mar. 3, 1977, Ser. No. 773,979

Int. Cl.[2] E04B *1/32*

U.S. Cl. 52—81 **19 Claims**



1. A building module for a building on a support having a preselected maximum height above the support, said module comprising:

a first plurality of substantially identical right isosceles triangular first members, each member having two side edges of a length substantially equal to said maximum height and a base edge resting on said support, said base edges collectively defining an enclosed area, each member sloping upwardly and outwardly and having base vertexes at each end of said base edge for joining the respective base vertexes of the adjacent member, the vertex opposite said base edge of each of said members providing roof support points; and

a second plurality of isosceles triangular second members, each second member having two side edges whose length is substantially equal to said maximum height and a base edge, said second members being joined to each other along their side edges with all vertexes opposide said base edges at a common point to form a roof, corresponding vertexes of said second members resting for support on respective ones of said support points, and said common point forming the roof apex having a height above said support which is substantially equal to said maximum height.

4,115,964

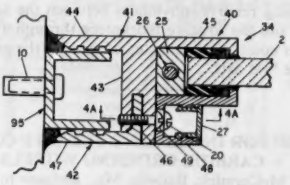
WINDOWS AND METHOD OF MAKING THE SAME

George W. Montrouil, Palo Alto, Calif., assignor to Montrouil Enterprises, Inc., Palo Alto, Calif.

Filed Aug. 8, 1975, Ser. No. 603,046

Int. Cl.[2] E04H *3/08*

U.S. Cl. 52—106 **18 Claims**



1. In a window frame assembly having framing means for supporting a glazing product, said assembly comprising:

a sub-framing member;

an *h*-shaped framing member having a single leg portion and a U-shaped portion, said U-shaped portion being adapted to fit over said sub-framing member;

means forming a glazing stop;

means for attaching said glazing stop to said *h*-shaped framing member to form, in cooperation with said single leg portion of said *h*-shaped member, a U-shaped channel about a peripheral edge of said glazing product;

saw proofing means including rotatable means disposed within said U-shaped channel; and

means for preventing the non-destructive removal of said glazing stop from said *h*-shaped framing.

4,115,965

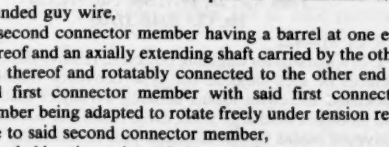
GUY STRAIN INSULATORS

Ira Thomas White, 318 Cherokee Dr., Trussville, Ala. 35173

Filed Apr. 9, 1976, Ser. No. 675,622

Int. Cl.[2] E04H *12/20*

U.S. Cl. 52—148 **2 Claims**



1. A device for attaching one end of an elongated guy strain insulator to a stranded guy wire with the other end of said insulator being anchored comprising:

(a) a first connector member carrying a clevis-like member adjacent one end thereof adapted to be attached to a stranded guy wire,

(b) a second connector member having a barrel at one end thereof and an axially extending shaft carried by the other end thereof and rotatably connected to the other end of said first connector member with said first connector member being adapted to rotate freely under tension relative to said second connector member,

(c) a sealed bearing unit carried by said first connector member and receiving said shaft,

(d) retainer means carried by said shaft and limiting axial movement of said shaft relative to said bearing unit so that upon the application of tension and torsion forces to said

guy wire said first connector member rotates freely on said bearing unit while said shaft remains stationary, and

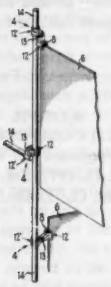
(e) means affixing said one end of said elongated guy strain insulator within said barrel of said second connector member with said insulator and said second connector member remaining stationary without any turning of said insulator about its longitudinal axis upon rotation of said first connector member under tension.

4,115,966

CLAMPING DEVICE FOR DISPLAY STRUCTURES

Barry DeLee, 2650 N. Lakeview, Chicago, Ill. 60614

Filed Feb. 14, 1977, Ser. No. 768,364
Int. Cl.² G09F *7/18*; E04H *12/20*
U.S. Cl. 52—148 **13 Claims**



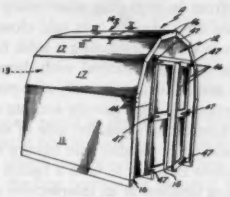
1. A clamping device comprising, in combination, a pair of socket-forming assemblies each mounted for independent pivotable movement relative to the other about a given pivot axis, each of said socket-forming assemblies comprising a pair of confronting members having confronting surfaces forming a socket, the longitudinal axes of the sockets of said confronting members being perpendicular to the pivot axis of each socket-forming assembly so that the angular position of said socket-forming assemblies can be adjusted to various positions between those where said socket axes are parallel and where they are generally perpendicular to one another, the socket-forming surface of one of the members of each of said pairs of confronting members providing a socket-forming surface extending over a greater arc than that of the other member and terminating at points which provide a socket entryway occupying an appreciable portion of a quadrant and which is asymmetrically related to a reference line extending transversely of its pivot axis, said pair of members of each socket-forming assembly being reversible in position in the clamping device so that the socket entryways of the two socket-forming assemblies can be asymmetrically related to said reference line on either side thereof, each of said pairs of confronting members forming a clamp and being mounted for relative movement wherein the confronting socket-forming surfaces thereof are progressively movable toward one another to clamp around an elongated member or slotted panel-receiving insert member when placed in the socket formed therebetween, and clamp-forming means for forcing each of said pair of members toward each other to tighten the same around an insert member or elongated member placed within the socket thereof.

4,115,967

BUILDING CONSTRUCTION AND METHOD AND KIT THEREFORE

Gerald A. Kragt, Marne, Mich., assignor to Jer Manufacturing, Inc., Coopersville, Mich.

Filed Nov. 21, 1977, Ser. No. 853,104
Int. Cl.² E04B *7/02*
U.S. Cl. 52—90 **13 Claims**



1. A building having a roof, side walls and end walls including:

a pair of spaced parallel end panels, each of said end panels formed of planar sheet material having generally the same silhouette and including roof line and side wall edges extending from the floor to the roof line and each panel being formed prior to assembly as a separate integrally formed panel member for an entire end wall of the building construction;

guide means attached to the inside surface of each of said end panels at spaced intervals along its periphery for positioning the ends of purlins at positions along said periphery;

a plurality of purlins having a length being generally equal to the distance separating said end panels, said purlins being located, abutted against, and attached to the planar sheet material of said end panels so that the ends of said purlins cooperate with said end panels to form the frame structure for the building;

said purlins including roof purlins located at spaced intervals along said roof line edges at each of said guide means, and at least one purlin located adjacent each of the junctures of the roof line edges and sidewall edges of said end panels; and

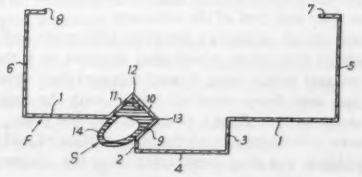
side and roof panel members attached to the outer edges of said purlins and end panels thereby enclosing the building.

4,115,968

FRAME AND SEAL ASSEMBLY

Asit Majumdar, Saddle Brook, N.J., assignor to Pioneer Industries, Div. of Core Industries Inc., Carlstadt, N.J.

Continuation of Ser. No. 743,056, Nov. 18, 1976. This application Dec. 20, 1977, Ser. No. 862,658
Int. Cl.² E06B *1/04, 7/16*
U.S. Cl. 52—204 **13 Claims**



1. In a frame for use with a door closure adapted to be moved between an open and a closed position including a frame section having a cross-section formed of a rabbet and an intersecting stop wall perpendicularly disposed thereto, the improvement comprising: the combination of a recess extend-

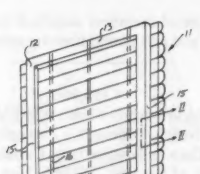
ing the entire length of said frame section with the cross-section of said recess symmetrically disposed about a medial plane of said recess bisecting said intersection of said rabbet and said stop wall, said recess defined by a pair of side walls disposed on either side of said medial plane substantially parallel to said medial plane and an end wall substantially perpendicular thereto connecting said side walls with said recess opening towards said closure; with a seal receivable in said recess and projecting therefrom in engaging relationship with said door closure when said door closure is in said closed position, said seal having a cross section including a solid retaining portion having the shape of a quadrilateral with three relatively perpendicular sides and a fourth relatively non-perpendicular side and a sealing portion having a narrow arcuate segment extending from a first substantially parallel side of said quadrilateral to a second substantially parallel side having substantially the shape of an involute of a circle with a radius of curvature of said involute being smallest at an intersection of said retaining portion and said sealing portion where said first substantially parallel side of said retaining portion is adjacent said door rabbet and greatest at an intersection of said retaining portion and said sealing portion of said seal where said second substantially parallel side of said retaining portion is adjacent said stop wall whereby said segment of said sealing portion having the smallest radius of curvature first comes into engaging relationship with said door closure as said door closure is moved from said open position to said closed position but before said closed position is reached.

4,115,969

BUILDING PANEL AND WALL

Donald Stewart Napier, 744 Canterbury Rd., Surrey Hills, Victoria, Australia (3127)

Filed Jul. 6, 1977, Ser. No. 813,355
Int. Cl.[2] E04B *1/10*
U.S. Cl. 52—233 **6 Claims**



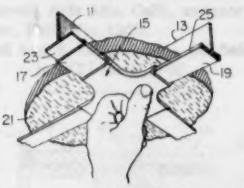
1. A wall of a cabin, house or like structure, comprising:
a. a plurality of spaced roof support posts extending between the floor and roof of the structure;
b. wall panels extending between said posts and having vertical side edges which abut adjacent to a respective post, said panels being formed adjacent their vertical side edges with frame members which, with the ends of said panels, serve to form a recess around said post;
c. means extending around the outer surface of said post for shielding and thus weatherproofing the abutment joint between adjacent panels, and
d. coverplates extending between and secured to said frame members thereby fully enclosing said support post and hiding the joint from the interior of the room, the ends of said shielding means being secured between said coverplates and said frame members.

4,115,970

GRID CEILING TRIM INTERSECTION CAP

Roger Neil Weinar, Buffalo, N.Y., assignor to Ceiling Resurfacing Systems, Inc., Eggertsville, N.Y.

Filed Sep. 1, 1977, Ser. No. 829,729
Int. Cl.[2] B44F *7/00*
U.S. Cl. 52—311 **8 Claims**



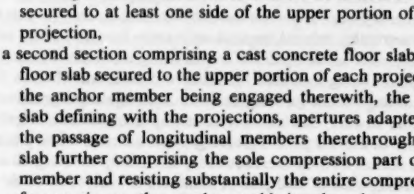
1. An intersection cap for covering ends of a plurality of pieces of grid ceiling trim mounted on grid ceiling supports where such intersect which comprises a substantially horizontal base member and a plurality of wall members extending upwardly from the base member, said wall members being tapered upwardly away from the base member at ends of the wall members and having at said extended tapered ends inwardly extending retainers suitable for holding onto grid ceiling trim.

4,115,971

SAWTOOTH COMPOSITE GIRDER

I. Steven Varga, 398 Woodward St., Waban, Mass. 02168

Filed Aug. 12, 1977, Ser. No. 824,049
Int. Cl.[2] E04B *1/24*
U.S. Cl. 52—334 **14 Claims**

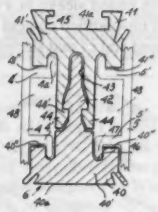


1. A composite structural member comprising:
a first section having a lower flange portion and a web, the web having a plurality of projections extending therefrom, the projections defining recesses therebetween and forming a discontinuous web, at least one anchor member secured to at least one side of the upper portion of each projection,
a second section comprising a cast concrete floor slab, said floor slab secured to the upper portion of each projection, the anchor member being engaged therewith, the floor slab defining with the projections, apertures adapted for the passage of longitudinal members therethrough said slab further comprising the sole compression part of the member and resisting substantially the entire compressive force acting on the member, and being the sole connector for the series of projections.

4,115,972
FIXED AND MOVABLE FRAME FIXTURES FOR DOORS AND WINDOWS

Giovanni Varlonga, Piazza della Repubblica, 7, Milano, Italy

Filed May 20, 1977, Ser. No. 799,019
Int. Cl.[2] E04B 1/62
U.S. Cl. 52—398 4 Claims



1. In an insulated composite metal frame for doors and windows with superimposed metallic frame parts and a jointing insulating member arranged between the superimposed metallic frame parts, wherein the metallic frame parts are arranged in parallel planes and are constituted from metallic profile sections and wherein the interposed jointing insulating member is coextensive therewith, connection means comprising said jointing insulating member composed of two coextensive parts snap engaged with each other, each of said coextensive insulating member parts having a T-like cross-section with an integral flange portion and an integral web portion, the flange portion having a reverse surface extending transverse to said web portion and facing the side where the web portion extends and the flange portion having an obverse surface extending transverse to said web portion and facing in a direction opposite to the extension of said web portion, a first one of said coextensive insulating member parts having an engagement groove in the web portion thereof opening at the free end of said web portion and coextensive therewith, the opening of said groove having a narrowing with respect to the width of the engagement groove, a second one of said coextensive insulating member parts having part of its web portion in the form of a tongue formation coextensive therewith and having an arrow like shape and adapted to penetrate into said engagement groove and be anchored by said narrowing therein, said integral web portions of each of said coextensive insulated mutually engaging member parts having on both sides thereof coplanar lateral surfaces extending parallel to said parallel planes of said metallic frame parts and an undercut groove in each of said reverse surfaces thereof to provide an elongated engagement seat therein, said metallic frame parts having each on the side facing said interposed jointing insulating member a pair of opposite spaced apart L-like ledge formations having each projecting legs of the L-shape engaged into the respective said undercut grooves thereby to provide connection between two superimposed metallic frame parts facing coextensively said interposed insulating member on both lateral sides thereof, said obverse surfaces being arranged in a position unobstructed by said metallic frame parts.

4,115,973
BUILDING STRUCTURE

Richard N. Anderson, Owensboro, Ky., assignor to V. E. Anderson Mfg. Co., Owensboro, Ky.

Division of Ser. No. 325,337, Jan. 22, 1973, Pat. No. 3,905,154, which is a division of Ser. No. 36,303, Jun. 22, 1970, Pat. No. 3,711,995. This application Sep. 16, 1975, Ser. No. 613,824
Int. Cl.[2] E06B 3/54
U.S. Cl. 52—773 6 Claims

1. A glazing strip for securing a glazing panel in a window structure or the like, comprising an elongated resilient member having a cross section including a first substantially straight portion, one end of which is independently flexible, the other end of which is adapted to engage a recess in the window frame for securing the glazing strip in the window frame, a second substantially straight portion depending substantially perpendicularly from the one end of the first portion adapted to engage a glazing panel positioned in the window frame for

securing the glazing panel in the window frame, and a third substantially straight portion one end of which is connected to the first portion which diverges from the first portion toward the other end of the first portion for securing the glazing strip in the recess in the window frame.

4,115,974
RETAINER ARRANGEMENT FOR PANELS

Jack Purcell, 5201 Curtis, Dearborn, Mich. 48126

Filed May 18, 1977, Ser. No. 798,071
Int. Cl.[2] E04B 1/38
U.S. Cl. 52—512 13 Claims

1. A retainer arrangement for securing a plastic overlay panel to a metallic support structure, said plastic overlay panel and metal support structure being constructed of materials having substantially dissimilar rates of thermal expansion, comprising:

a continuous plastic retainer strip extending along said metallic support structure;

means for fastening said plastic retainer strip to said metallic support structure;

said plastic retainer strip having a portion for receiving an edge of said plastic overlay panel trapping said plastic overlay panel edge therein, said trapped edge of said plastic overlay panel being contour blended with said metallic support structure to create a highly visible seam with said metallic support structure; and

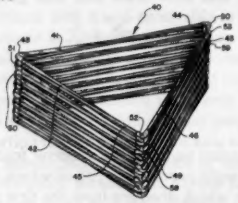
means for mounting at least one other edge of said plastic overlay panel to said metallic support structure, whereby said trapped plastic edge may freely expand relative to said metallic support structure to accommodate thermal growth and thereby eliminate distortions at said highly visible seam of said plastic overlay panel imposed by connection to said support structure.

4,115,975

FOLDABLE/EXTENSIBLE STRUCTURE

Robert L. Bliss, Salt Lake City, Utah, assignor to University of Utah, Salt Lake City, Utah

Filed Aug. 11, 1977, Ser. No. 823,785
Int. Cl.[2] E04B *1/343*
U.S. Cl. 52—646 **12 Claims**



1. A foldable and linearly extensible structure comprising:

a plurality of base modules, each base module comprising six rigid members flexibly interconnected end-to-end in a closed figure with the closed figure being configurated with:

one end of the first rigid member swivelly interconnected to one end of a second rigid member in a first swivel;

the other end of the second rigid member swivelly interconnected to one end of a third rigid member in a second swivel;

the other end of the third rigid member swivelly interconnected to one end of a fourth rigid member in a third swivel;

the other end of the fourth rigid member swivelly interconnected to one end of a fifth rigid member in a fourth swivel;

the other end of the fifth rigid member swivelly interconnected to one end of sixth rigid member in a fifth swivel;

the other end of the sixth rigid member swivelly interconnected to the other end of the first rigid member in a sixth swivel;

each base module further including the first rigid member pivotally connected to the inside of the fourth rigid member in a first pivot, the second rigid member pivotally connected to the outside of the fifth rigid member in a second pivot and the third rigid member pivotally connected to the inside of the sixth rigid member in a third pivot, all of said pivotal connections being made adjacent the midpoint of each respective rigid member; and

said foldable and linearly extensible structure comprising flexibly and serially interconnected base modules, wherein a first base module is flexibly interconnected to a second base module by flexibly joining the first, third and fifth swivels of the first base module to the second, fourth and sixth swivels of the second base module, respectively, and the second base module is flexibly interconnected to a third base module by flexibly joining the first, third and fifth swivels of the second base module to the second, fourth and sixth swivels of the third base module, respectively, thereby swivelly and flexibly interconnecting a plurality of base modules to form the foldable and linearly extensible structure, the structure being foldable into a relatively flat configuration having a triangular outline.

4,115,976

METHOD FOR SCREEDING CEMENT

Walter J. Rohrer, Kansas City, Kans., assignor to John Rohrer Contracting Company, Kansas City, Kans.

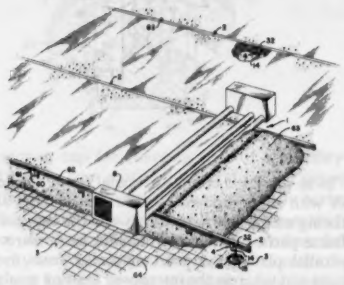
Filed Mar. 21, 1977, Ser. No. 779,606
Int. Cl.[2] E04G *21/10*
U.S. Cl. 52—741 **4 Claims**

1. In a method for screeding cement floors to a desired level with a self-propelled screeding machine, including providing an area of ground with an aggregate bed surface thereover, and a pair of rails for supporting each side of said screeding machine above said aggregate bed surface, the improvement comprising:

(a) digging a plurality of holes through said aggregate bed surface into the ground; said holes being arranged in at least two substantially parallel and spaced apart rows wherein the holes in each row are spaced apart and generally aligned;

(b) pouring unsolidified cement into each of said holes;

(c) inserting an open ended sleeve in a substantially vertical orientation in the unsolidified cement in each of said holes; positioning a closed end of said sleeve downwardly within



said cement, and positioning an open end of said sleeve in a position communicating with the area above the free surface of said cement;

(d) curing said cement to a solidified state, thereby forming a cement footing around each sleeve and fixedly setting the same in said bed surface;

(e) inserting a rail support member telescopically into each sleeve; said support member including an upper end; and

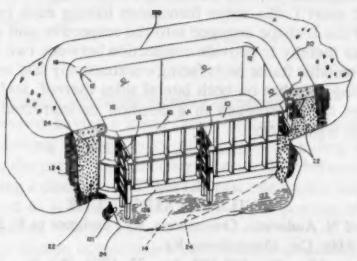
(f) connecting said rails to the upper end of each support member whereby the weight of said screeding machine does not settle said support members and cause undulations and deviation from the desired level of said floor.

4,115,977

METHOD OF ERECTING SWIMMING POOL STRUCTURE

Lyle E. Bertsch, 8207 Seiler, New Haven, Ind. 46774

Division of Ser. No. 713,255, Aug. 10, 1976. This application Aug. 1, 1977, Ser. No. 820,464
Int. Cl.[2] E04B *1/35*
U.S. Cl. 52—742 **16 Claims**



1. A method of erecting a swimming pool comprising the steps of preparing the ground for a swimming pool bottom and to provide a lip extending generally horizontally outwardly from said pool bottom, placing a plurality of wall sections on said lip, securing said wall sections together so as to form a generally continuous interior wall surface conforming shape to

the interior wall of said pool, attaching braces to said wall sections at spaced intervals, said braces extending rearwardly of said wall sections, each of said braces having a pair of stake guides, one of said stake guides being adjacent to said wall sections, the other stake guides being remote from said wall sections, placing stakes in said guides, positioning the bottoms of said wall sections as desired, driving said adjacent stakes into said lip, holding said wall sections so as to position said wall surface generally vertical, driving said remote stakes into said lip, lifting said wall sections to a desired height, adjusting said wall sections a desired attitude relative to said vertical, and fastening said stakes and braces together.

4,115,978

APPARATUS FOR AUTOMATICALLY FILLING AND CLOSING SACKS

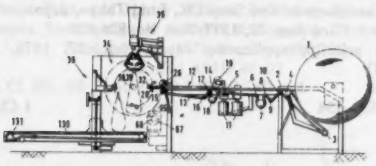
Carl Langemeyer, and Konrad Tetenborg, both of Lengerich, Fed. Rep. of Germany, assignors to Windmoller & Holscher, Lengerich, Fed. Rep. of Germany

Filed Jun. 24, 1977, Ser. No. 809,653

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1976, 2629065

Int. Cl.² B65B *43/30*

U.S. Cl. 53—570 **11 Claims**



1. An apparatus for automatically filling and closing sacks, preferably side pleated sacks comprising a frame having an axis; supply means with respect to the frame for supplying sacks; filling means for filling sacks and having means for opening a sack to be filled and having a movable filling funnel; welding means for welding filled sacks; take away means for removing filled sacks; said supply means, said filling means, and said welding means being positioned in equal angular steps about the frame axis; and conveying means intermittently rotatable in equal angular steps about the frame axis for sequentially transferring sacks between the supply means, filling means, and welding means; the sacks having upper regions defining filling apertures; and the conveying means comprising:

two spaced-apart rotatable vertical axis (**41**) having facing inner surfaces;

two support shafts (38) for supporting said two discs, said support shafts being horizontal, coaxial, and rotatable and having outer ends connected to the frame and inner ends facing and spaced-apart from each other, the inner ends supporting said discs with a space between their facing inner surfaces;

rotation means for synchronously rotating said two support shafts so that said vertical discs are intermittently rotated in equal angular steps;

pairs of aligned shafts (**43**) positioned in equal angular steps on said two discs (**41**), the shafts of each pair of aligned shafts being displaceable towards and away from each other and the pairs occupying positions offset eccentrically from each other and from the axis of the frame during rotation of said vertical discs;

confronting tongs (**37**) secured on each of said aligned shafts; and

controlled rotary drive means (**46, 54, 55, 56, 57**) operatively associated with said rotation means and said confronting tongs for moving said confronting tongs into a position for engaging at both sides of its filling aperture a sack supplied by said supply means, for sequentially moving the tongs to transport an engaged sack from the supply means to the filling means and to transport a filled sack from the filling means past the welding means to the take away means, said confronting tongs being moved to deposit the filled sack on the take away means in such manner that the upper region of the filled sack is buckled, pulled taut, and turned through 90° prior to welding.

4,115,979

DEVICE FOR STEPWISE FEEDING A HOSE FOR PACKAGING PRODUCTS, IN PARTICULAR FRUIT AND VEGETABLE PRODUCTS

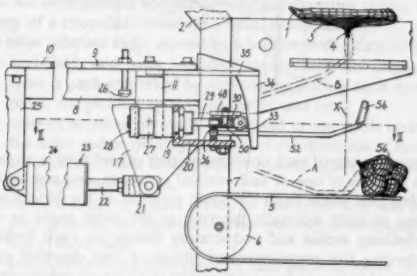
Rino Morini, Via San Francesco, 35, Imola (Province of Bologna), Italy

Filed Apr. 18, 1977, Ser. No. 788,489

Claims priority, application Italy, Apr. 29, 1976, 3414 A/76

Int. Cl.² B65B *41/00*

U.S. Cl. 53—393 **3 Claims**



1. A device for stepwise feeding a hose having a lower closed end for packaging fruit and vegetable products, comprising a frame, a bracket rotatably supported on said frame about a horizontal axis, a pair of arms pivoted on said bracket about respective axes perpendicular to said horizontal axis, said arms having free ends provided with jaws, a first hydraulic jack acting between said frame and said bracket for rotating the arms between a raised position in which said jaws are arranged beneath said closed end of the hose and a lowered position in which said jaws are arranged above a removing conveyor, a second hydraulic jack mounted on said bracket for operating said arms so as to cause said jaws to grip the lower closed end of the hose when the arms are in raised position and to release said closed end, when the arms are in lowered position.

4,115,980

WALL SYSTEM

Charles Siméon Martel, 36 blvd. Jacques Cartier, Lauzon, Quebec, Canada; Jean-Guy Papillon, 332, blvd. Centenaire, and Paul Papillon, 186, blvd. Centenaire, both of St-Basile de Portneuf, Quebec, Canada (G0A 3G0)

Filed Sep. 7, 1976, Ser. No. 721,102

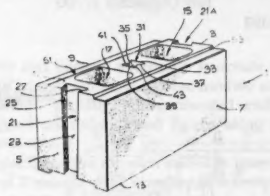
Claims priority, application Canada, Sep. 10, 1975, 235380

Int. Cl.² E04C *1/10*

U.S. Cl. 52—591 **5 Claims**

1. A wall structure comprising a plurality of courses of substantially rectangular building blocks of substantially uniform height, the blocks in each course being offset longitudinally a distance equal to one-half the length of a block with respect to blocks in adjacent courses, each block having means for use in interlocking the block to other blocks in the same course and to blocks in the adjacent lower course, the interlocking means being located in at least one endwall of the block and in the center of the block, and at both locations extending the full height of the block, the interlocking means in the endwall of each block comprising a vertical dovetail slot

positioned centrally of the endwall and tapering uniformly down from the top to the bottom of the block, each slot being adapted to confront another, substantially identical slot in another block of the same course, and the interlocking means in the center of each block comprising a centrally positioned through vertical opening having the shape of two of said dovetail slots positioned in face to face relationship, said opening tapering down at the same angle from the top to the bottom of the blocks as said dovetail slot, the dovetail slot at the bottom of each block having a size equal to about one-half of the size of said slot at the top of the block, and said vertical opening having a size at the top of the block equal to about the size of two of said dovetail slots positioned in face to face relationship at the bottom of said block, said blocks, said slots and said openings being dimensioned so that when placed in adjacent



courses the axis of each confronting pair of said slots in aligned with the axis of one of said vertical openings, and removable locking pins made from the same material as the blocks and having straight sidewalls tapering at the same angle as the interlocking means and cooperating therewith, each locking pin having the complementary shape of two dovetail slots positioned in face to face relationship and a length substantially equal to the height of two of said blocks, each locking pin having a size at its large end about equal to the size of two of said dovetail slots in face to face relationship at the top of said block, and a size at its small end substantially equal to the size of the opening at the bottom of the block, said tapering locking pins being adapted to be inserted into said aligned tapered slots and openings and driven home to form a wedge fit, with the straight sidewalls of said pins in frictional engagement with the walls defining said aligned slots and openings.

4,115,981

APPARATUS FOR ASSEMBLING AND PACKING PHOTOGRAPHIC PRINTS WITH ASSOCIATED DEVELOPED FILMS

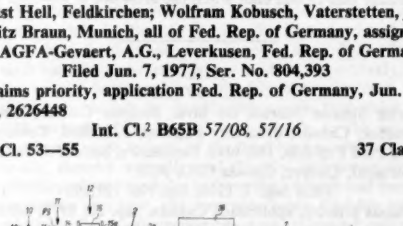
August Hell, Feldkirchen; Wolfram Kobusch, Vaterstetten, and Fritz Braun, Munich, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany

Filed Jun. 7, 1977, Ser. No. 804,393

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1976, 2626448

Int. Cl.[2] B65B *57/08, 57/16*

U.S. Cl. 53—55 **37 Claims**



1. Apparatus for assembling developed prints with related developed films which are provided with first and second indicia respectively denoting successive film frames and the last film frame and which, prior to development thereof, are confined in information-bearing envelopes, comprising first and second feeding devices respectively including first and second severing means operative to subdivide developed films into sections and a web of prints into discrete prints, said web having third and fourth indicia respectively denoting successive prints and the last one of a series of prints which are related to a given film; a third feeding device including a source of a succession of information-bearing envelopes and means for decoding the information on successive envelopes and for transmitting corresponding signals; conveyor means cooperating at least with said first and second feeding devices to assemble sections of successive films with related prints; a packing unit including a source of empty containers; means for transferring successive assembled film sections and related prints into successive containers; control means including means for operating said first severing means in synchronism with said second severing means; and computer means having input means for said signals.

4,115,982

TUBE CASER

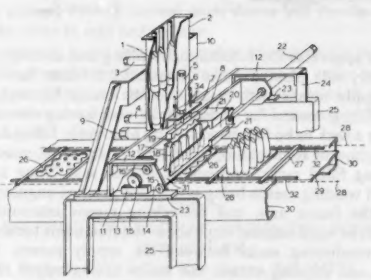
Atsushi Sato, Chiba, and Hikotarou Kawaguchi, Sakura, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Aug. 22, 1977, Ser. No. 826,401

Claims priority, application Japan, Sep. 27, 1976, 51-129536[U]

Int. Cl.[2] B65B *5/08, 5/10*

U.S. Cl. 53—534 **1 Claim**



1. An apparatus for inserting rows of tubes into a receptacle, which comprises:

intermittently movable conveyor means for supporting a receptacle, said conveyor means comprising an elongated planar member having upstanding longitudinally spaced-apart drive elements extending thereacross for engaging the rearward edges of receptacles in order to advance same in the lengthwise direction;

a chute disposed above said conveyor means and adapted for holding a row of tubes;

a movable feed frame disposed between said chute and said conveyor means, said feed frame having a plurality of chambers therein for receiving said row of tubes from said chute, said chambers being substantially U-shaped in cross section, said feed frame being movable between a first retracted position wherein said chambers are aligned to receive a row of tubes discharged from said chute and a second advanced position wherein said chambers are disposed above said receptacle;

a stationary tube-receiving bottom plate positioned above and extending crosswise of said conveyor means, said feed frame being disposed directly above said bottom plate so that in said first retracted position of said feed frame said bottom plate blocks the lower end of said chambers, said bottom plate terminating short of the position of said

chambers in said second advanced position of said feed frame;

a reciprocable holding plate adapted to extend across the open sides of said chambers to retain tubes therein; and

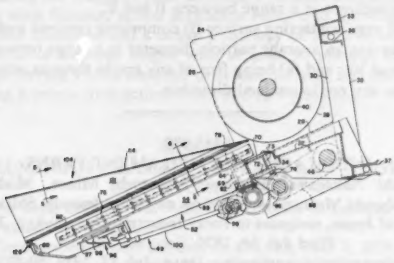
a movable presser member arranged to overlie said chambers when said feed frame is in said second advanced position to press said tubes downwardly into said receptacle, said presser member having inverted V-shaped grooves in the lower surface thereof for engaging the seal portions of said tubes, the crests of said V-shaped grooves extending at an angle of about 45° to an imaginary plane passing through the centers of a row of tubes when said row of tubes are positioned in said chambers in said second advanced position of said feed frame.

4,115,983

ROW-CROP HARVESTING HEADER

Theodore Marion Barnes; Joseph John Shindelar; Merlyn Duane Bass, and Henry William Suechting, Jr., all of Ottumwa, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Aug. 19, 1974, Ser. No. 498,781
Int. Cl.[2] A01D *45/02*
U.S. Cl. 56—98 **24 Claims**



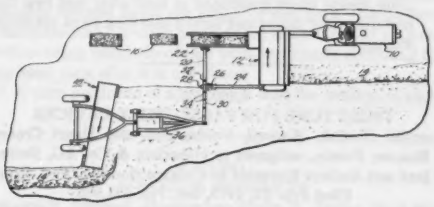
1. A row crop harvesting header for a mobile harvesting machine for removing a plurality of rows of row planted crop material from a field as the machine advances and comprising: a header frame having opposite sides and a floor extending between the opposite sides; a transverse auger extending between the opposite sides above the floor for moving crop material laterally along the floor and including an axial auger tube and auger flighting wound around the tube; a plurality of generally fore and aft extending divider members mounted on the header frame and defining a plurality of generally fore and aft passageways between adjacent divider members, each passageway being adapted to receive the crop material growing in a row as the machine advances; a crop gathering means supported on the frame adjacent each passageway and including a pair of endless flexible gathering elements respectively disposed on opposite sides of the passageway, each pair of gathering elements having opposite, fore and aft extending, inner runs moving rearwardly along the passageway and operative to engage the crop material in the passageway and move it rearwardly to the auger, the rearward, discharge ends of each pair of endless flexible gathering elements being disposed above and adjacent to the forward end of the floor and directly below the front side of the auger tube; and cutting means below and adjacent to the forward intake end of each pair of gathering elements for severing the crop material from the field as it is engaged by the gathering element.

4,115,984

ARRANGEMENT FOR INTERCONNECTING A SIDE DELIVERY RAKE AND A BALER

Talmadge Whipple Simpson, Rte. 2, Cochran, Ga. 31014

Filed Dec. 7, 1976, Ser. No. 748,290
Int. Cl.[2] A01D *55/26*; B60D *1/14*
U.S. Cl. 56—13.5 **8 Claims**



1. An arrangement for performing simultaneous raking and baling of a crop distributed on a field, comprising:

a baler adapted to be moved by a tractor over a first strip of said field, said baler including means, laterally displaced from a path traversed by the tractor during such movement, for picking up a windrow of said crop;

a support member pivotally connected at one of its ends to the baler and projecting laterally of the direction of movement of the baler towards the opposite side of said strip from the tractor path;

additional support means joined to said baler and said support member for maintaining the member from engaging the ground; and

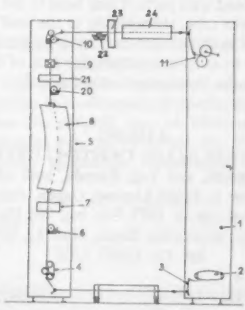
a windrow-forming side delivery rake secured to the other end of the support member and movable with the baler to pass over a second strip of said field, at least the major portion of said second strip extending laterally beyond the first strip on the opposite side thereof from said tractor path.

4,115,985

METHOD OF APPARATUS FOR THE THERMAL TREATMENT OF TEXTILES ARTICLES

Jean Venot, Roanne, France, assignor to ASA S.A., Roanne, France

Filed Jul. 11, 1977, Ser. No. 814,381
Claims priority, application France, Jul. 12, 1976, 76 21371
Int. Cl.[2] D02G *1/02*; D01H *13/28*
U.S. Cl. 57—34 HS **7 Claims**



4. In an apparatus for texturising a moving yarn of the type comprising:

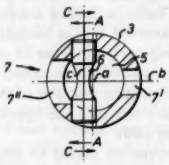
(a) means for storing a supply of yarn;

(b) yarn delivery means;

(c) first thermal treatment means;

(d) yarn cooling means;
(e) false twist producing means;
(f) further thermal treatment means; and
(g) withdrawal and rewinding means;
the improvement comprising:
(h) complementary treatment means comprising means for wetting the yarn and means for subjecting the yarn to a high frequency yarn heater, said complementary treatment means being positioned at least after said first thermal treatment means and before said false twist producing means.

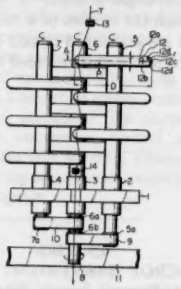
4,115,986
TWIST TUBE FOR FALSE-TWIST DEVICES
Joachim Bieniok, Wattwil, Switzerland, and Henri Crouzet, Roanne, France, assignors to Heberlein & Co. AG, Switzerland and Ateliers Roannais de Constructions Textiles, France
Filed Feb. 21, 1975, Ser. No. 551,985
Claims priority, application Switzerland, Apr. 5, 1974, 4834/74
Int. Cl.[2] D01H *7/92*; D02G *1/06*
U.S. Cl. 57—77.3 **1 Claim**



1. A twist tube for a false twist device for texturing textile yarns comprising a tubular portion consisting of a straight tubular part and a coaxial tubular uniform head of larger diameter than that of said tubular part, said tubular part including a longitudinal bore that passes into an enlarged longitudinal bore in said head for the passage of textile yarn through said tubular portion when the twist tube is in operation, and a single cylindrical pin fixed in said head and extending through said enlarged head for the yarn to be wound once therearound prior to passing out of said enlarged head, said pin having uniform cylindrical ends with an intervening cylindrical concave surface symmetrically disposed between said ends and said pin being mounted in the wall of said head with its axis displaced laterally with respect to the axis of said head by a distance which is a fraction of the diameter of said cylindrical ends, and said head being formed with a transverse bore thereon having an axis perpendicular to that of said pin and constituted by openings in opposed wall parts of said head to aid the threading of yarn in the twist tube, the opening in the wall part towards which said pin is laterally displaced being larger than the other of said openings so as to compensate for lack of balance of the twist tube about the longitudinal axis thereof.

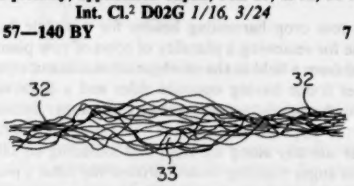
4,115,987
FRICTION FALSE-TWISTING DEVICE
Katsutoshi Taniguchi, and Yoji Kuroda, both of Matsuyama, Japan, assignors to Teijin Limited, Osaka, Japan
Filed Apr. 6, 1977, Ser. No. 785,126
Claims priority, application Japan, Nov. 12, 1976, 51-135239
Int. Cl.[2] D02G *1/08*
U.S. Cl. 57—77.4 **7 Claims**

1. A friction false-twisting device comprising three shafts disposed at vertexes of a triangle so as to be parallel to each other and rotatable in the same direction, and a plurality of friction discs each having a yarn contacting surface made of ceramic disposed on each of said shafts, said friction discs being positioned along a screw-thread and being partially juxtaposed, wherein each said friction disc comprises:
a pair of end surfaces disposed in parallel having a distance T (mm) between said end surfaces in a range between 5 and 8 mm, and said disc having a shape symmetrical with respect to a plane centrally situated between said end surfaces and parallel to said end surfaces;
a curved edge surface disposed at a position between said end surfaces having a radius of curvature R (mm) in a range between 5 and 8 mm;
a pair of connecting surfaces disposed at positions between said end surfaces and said curved surface having a smaller



radius of curvature *r* (mm) in a range between 1/5 R and 2/5 R; and
a yarn contacting surface comprising said curved surface and a pair of said connecting surfaces having a surface roughness in a range between 1^s and 6^s,
said yarn contacting surface (i) comprising ceramic material having an average particle diameter in a range between 2 and 30μ and (ii) being free of any tracks thereon oriented in any predetermined direction.

4,115,988
INTERLACED MULTIFILAMENT YARNS
Kiyoshi Nakagawa, Mishima; Masatoshi Mineo, Mishima; Tadayuki Matsumoto, Mishima, and Kozo Imaeda, Shizuoka, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan
Filed Jul. 14, 1976, Ser. No. 705,145
Claims priority, application Japan, Jul. 18, 1975, 50-87372
Int. Cl.[2] D02G *1/16, 3/24*
U.S. Cl. 57—140 BY **7 Claims**

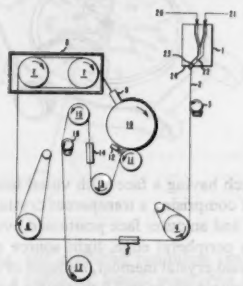


1. An interlaced multifilament yarn produced by a fluid treatment operation utilizing jetting fluid, said yarn being provided with such property that the degree of interlacing of individual filaments of said multifilament yarn is increased:
by imparting repeated stretching action to said yarn, and
conducting said repeated stretching action under a yarn tension between 0.1–1.0 g/d.

4,115,989
PRODUCT AND PROCESS
Jerzy Spolnicki, Camden, S.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed May 2, 1977, Ser. No. 792,708
Int. Cl.[2] D02G *1/16, 3/04*
U.S. Cl. 57—140 BY **6 Claims**

1. A multifilament polyester yarn of bicomponent filaments

composed of a poly(ethylene terephthalate) component and a copolyester component intimately adhered together in side-by-side relationship along the length of each filament, the poly(ethylene terephthalate) component having a relative viscosity of 12 to 15 as determined for a solution of 0.8 gram of polymer in 10 milliliters of hexafluoropropanol at 25° C. and the copolyester component having a relative viscosity of 23 to 26 that is 11 to 14 units higher than the relative viscosity of the poly(ethylene terephthalate) component, the copolyester component consisting of about 90 mole percent of ethylene terephthalate and about 10 mole percent of other ester units that form a copolyester which has a Tg shrinkage value of 49° to 65° C.; the filaments having a substantially uniform cross section along the length of each filament, a random helical crimp along each filament which is random relative to the crimp of adjacent filaments, and a crimp frequency of 25 to 40 crimps per inch of filament length with at least 50 percent of the crimps having a helix diameter of at least 1.7 mils; and the yarn having a crimp contraction value of 5 to 9 percent.



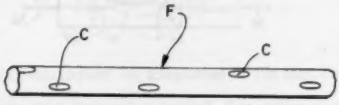
4,115,990
VOLUMINOUS FILAMENTARY YARN AND METHOD OF MANUFACTURE

Chester John Dudzik, Warwick, R.I., assignor to Leesona Corporation, Warwick, R.I.

Continuation-in-part of Ser. No. 693,738, Jun. 7, 1976, abandoned. This application Jul. 14, 1977, Ser. No. 815,844

Int. Cl.² D02G *1/02*

U.S. Cl. 57—140 R **6 Claims**



1. A method of manufacturing yarn comprising the steps of, providing a source of unprocessed supply yarn constituted of a bundle of extruded thermoplastic filaments wherein all of said filaments are either undrawn or all are partially drawn to the same degree with at least a substantial portion of the filaments having contaminant particles embedded therein and randomly spaced along the length thereof and with said bundle of filaments being twisted to a level to preclude disintegration of said filaments during subsequent processing, continuously withdrawing the yarn from said source at a preselected linear speed, passing said yarn through a draw-twist zone under a predetermined tension to simultaneously draw said yarn to a predetermined cross-sectional dimension while effecting breakage of substantially all of the filaments at the loci of the contaminant particles therein to provide free ends of said filaments, said yarn when in said draw-twist zone being subjected to stretching in the order of 40-95 percent of the ultimate elongation of the yarn, concurrently heating and cooling said yarn in said draw-twist zone while twisting the yarn in said heated zone and untwisting the yarn to thereby false twist the yarn, a substantial portion of the free ends of the filaments being twisted into said bundle of filaments constituting the yarn as the yarn is twisted and at least a portion of said free ends being released to extend away from said bundle of filaments when said yarn is untwisted with unbroken filaments randomly situated along the length of said yarn with portions of said unbroken filaments being on the surface of said yarn and portions being interiorly of said yarn, and finally collecting the processed yarn after it is untwisted.

5. A yarn produced in accordance with the method of claim 1.

4,115,991
ASBESTOS PRODUCTS

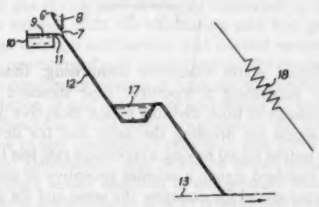
Anthony N. Magnall, Haslingden; Philip H. Taylor, Rochdale, and Fred Roberts, Blackpool, all of England, assignors to TBA Industrial Products Ltd., Manchester, England

Filed Feb. 23, 1976, Ser. No. 660,495

Claims priority, application United Kingdom, Mar. 8, 1975, 9746/75

Int. Cl.² D02G *3/20*

U.S. Cl. 57—153 **19 Claims**



1. A process for producing a coherent strand from a dispersion of asbestos in an aqueous soap solution containing a fatty acid in an amount up to a 100 percent molar excess over the fatty acid content of the soap comprising forming a stream of said dispersion, chilling said newly formed stream sufficiently to gel the dispersion and form a strand, said chilling step being effected by contacting the newly-formed stream with cold water, and treating the strand to prevent redispersion thereof under the action of heat.

8. Coherent asbestos strands and yarns therefrom made by a process according to claim 1.

4,115,992
METHOD OF MAKING TEXTURED CONTINUOUS FILAMENT YARN

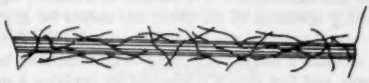
Roeland Van Tijn, Almelo, Netherlands, assignor to Hollandse Signaalapparaten B.V., Hengelo, Netherlands

Division of Ser. No. 695,935, Jun. 14, 1976, abandoned. This application Feb. 28, 1977, Ser. No. 772,915

Claims priority, application Netherlands, Jun. 23, 1975, 7507442

Int. Cl.² D02G *3/40*

U.S. Cl. 57—164 **17 Claims**



1. Method for the manufacture of textured continuous filament yarn from a sliver or a roving comprising at least staple fibre material, comprising the steps of drafting said sliver or roving in a wet condition to form a thinner fibre strand, com-

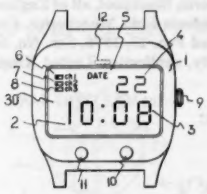
bining the wet thinner fibre strand so drafted with at least one stable continuous filament to form a filament-fibre blend, and then bonding the staple fibres to the continuous filament, wherein the sliver or roving includes an at least potentially adhesive first component, said component bonding said staple fibres to said at least one filament during the bonding step.

4,115,993

DIGITAL ALARM WATCH

Tokio Moriya, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Oct. 7, 1976, Ser. No. 730,430
Claims priority, application Japan, Oct. 13, 1975, 50-123013
Int. Cl.[2] G04B *23/13;* G04C *21/12*
U.S. Cl. 58—38 R **1 Claim**



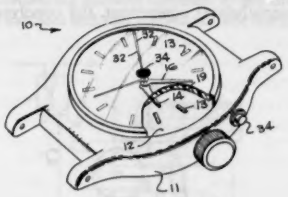
1. A digital alarm timepiece comprising: time standard means for generating a repetitive time standard signal for defining passage of time; dividing means receptive of said time standard signal for dividing the same and for developing a repetitive output signal having a repetition rate less than that of said time standard signal; a counter receptive of said dividing means output signal for counting the same and for developing a count representative of time and date; date-second switching circuit means cooperative with said counter for switching between a count representative of seconds and a count representative of date; a plurality of memory circuits each defining a different channel and each for storing a time signal representative of a time; a display responsive to the contents of said counter and to said time signals for displaying the time corresponding thereto; channel selecting means for applying a selected one of the time signals stored in one of said memories or the count switched by said date-second switching circuit means to display a selected time or a date or seconds; a coincidence circuit for comparing the count developed by said counter with the time signals stored in said memories and for developing an output signal when the count and one of said time signals coincide; means for actuating said channel selecting means, wherein said means for actuating said channel selecting means comprises a switching circuit operable between two states, a first switch connected for applying a signal to change the state of said switching circuit, and a second switch connected in series with said switching circuit for controlling application of an actuating signal to said channel selecting means through said switching circuit when the same is in a conductive state; alarm means responsive to the output signal of said coincidence circuit for sounding an alarm, wherein said alarm means is responsive to a control signal for terminating operation of the same; and means for applying a control signal to said alarm means, wherein the last-mentioned means includes a second switching circuit operable between two states, said first switch connected for applying a signal to change the state of said second switching circuit, and a third switch connected in series with said second switching circuit for controlling application of the control signal to said alarm means through said second switching circuit when the same is in a conductive state.

4,115,994

DIAL ILLUMINATION MEANS

James N. Tomlinson, 1114 Kathryn St., Boalsburg, Pa. 16827

Filed Jul. 13, 1976, Ser. No. 705,569
Int. Cl.[2] G04B *39/00, 19/30*
U.S. Cl. 58—50 R **16 Claims**



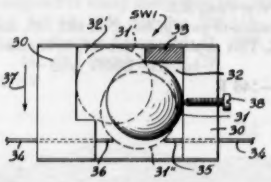
1. In a watch having a face with visual hour indicators, the improvement comprising a transparent crystal member having an inner face and an outer face positioned over the watch face and having a peripheral edge, light source means positioned internally of said crystal member, a source of electrical voltage selectively connectable to said light source means for actuation of said light source means, reflector means positioned radially outwardly of the peripheral edge of said crystal member for receiving light rays directly from the peripheral edge of said crystal member which have been directed internally of said crystal from said light source means and for reflecting and concentrating substantially all of said light rays emitted from the peripheral edge of the crystal member in the area of said dial in which said visual indicators are located.

4,115,995

AUTOMATIC WRISTWATCH CONSTRUCTION

André Guy Brien, 3110 rue Germain, Fabreville, Canada

Filed Sep. 20, 1976, Ser. No. 724,283
Int. Cl.[2] G04C *3/00, 9/00, 19/00*
U.S. Cl. 58—50 R **9 Claims**



1. In a wristwatch having a housing with an electronic digital visual display and a program electrical circuit means in said housing to operate said visual display, the improvement comprising motion activated switch means to reset said digital visual display to a desired digital value, said switch means comprising a first and second gravity activated switch, a switch contact in said first and second switch and connected to a respective function of said circuit means, said second switch when motion activated to cause a switch contact closure activating its respective function of said circuit means to permit a display of an actual digital value on said visual display, said first switch being motion activated in a first direction after said second switch to cause a switch contact closure activating its respective function of said circuit means to activate sequential display movement of said actual digital value selected by said second switch, said first switch being activated in a second direction to stop the activation of said sequential display movement to a desired value.

4,115,996
SELF ACTUATING PENDULUM SYSTEM

Raymond Walter Coy, 805 Libby Dr., Riverside, Calif. 92507

Filed Oct. 18, 1976, Ser. No. 733,187
Int. Cl.[2] G04B *17/02*
U.S. Cl. 58—129 1 Claim

1. A selfstarting, self actuating pendulum that accelerates from stand-still to a stable arc length employing a 60 Hz synchronous motor, geared to counter rotating eccentric weights which form an integral part of a partially counter balancing weight and fixed to the pendulum rod above the pendulum axis of rotation which weights rotate in a plane perpendicular to the center line of the pendulum and apply a sinusoidal thrust to the pendulum and when combined with the action of gravity overcome the pendulum losses and maintain predetermined, continuous and regular pendulum oscillation.

4,115,997
TIMING ATTACHMENT FOR TELEPHONES

A. Terry Rogovin, 900 N. Lake Shore Dr., Chicago, Ill. 60611

Filed Apr. 15, 1977, Ser. No. 787,911
Int. Cl.[2] G04B *47/02;* G04F *1/06*
U.S. Cl. 58—144 7 Claims

1. A timing attachment for telephones or the like, comprising:

a base member having two ends including means at one end thereof for mounting said base member;

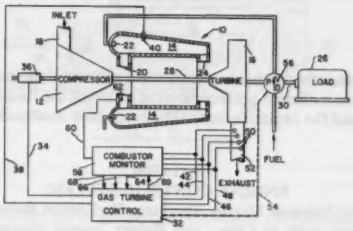
an elongate member including hourglass means for measuring a predetermined period of time each time said elongate member is rotated substantially 180° from a substantially vertical first position to a substantially vertical second position, said elongate member including a pivot member secured to one side thereof substantially at a midpoint thereof and pivotally attached to a second end of said base member, said elongate member including at least one substantially cylindrical end; and

indicating means for automatically indicating the passage of at least one period of time when said elongate member is rotated, said automatic indicating means including a cap rotatably secured on top of said cylindrical end of said elongate member, said cap including at least one set of two successive time period indicia displayed thereon on opposite sides of said cap.

4,115,998
COMBUSTION MONITOR

Kendall E. Gilbert, Schenectady; Daniel Johnson, Rexford, and Robert Raymond Macier, Saratoga Springs, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 638,855, Dec. 8, 1975, abandoned. This application Dec. 27, 1976, Ser. No. 754,271
Int. Cl.[2] F02C *9/08*
U.S. Cl. 60—39.09 R 10 Claims



1. In combination, a gas turbine of the type having a compressor, a combustion system for receiving fuel and compressed air from said compressor and for generating an annular hot gas stream, a turbine adapted to be rotatably driven by said annular hot gas stream and drivingly connected to said compressor, an exhaust duct for exhausting said hot gas stream after passage through said turbine, and control means for controlling the operation of said gas turbine and for regulating fuel flow to the combustion system in response to various parameters of operation of said gas turbine and means for early detection of malfunctions in the combustion system and for causing the fuel flow to said combustion system to shut off in response to a detected malfunction, said detection means including:

a temperature sensor disposed in temperature sensing relationship to the discharge flow of compressed air from said compressor;

a plurality of temperature sensors disposed in a generally equally spaced annular array in temperature sensing relationship to the hot gas stream generated by said combustion system;

monitoring means for automatically and repeatedly scanning each said temperature sensor and for determining the median temperature sensed by said hot gas stream temperature sensors during each complete scan of said temperature sensors, for determining a high and a low trip limit for each complete scan of said temperature sensors as a function of the reading of said compressor discharge temperature sensor and said median temperature, for automatically comparing each said hot gas stream temperature sensor reading to said high and said low trip limits, and for generating a signal operative to cause said control means to shut off fuel flow to said combustion system when a predetermined number of said hot gas stream temperature sensors are outside of said trip limits in a predetermined pattern.

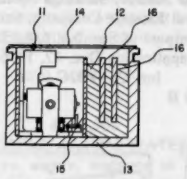
4,115,999
USE OF HIGH ENERGY PROPELLANT IN GAS GENERATORS

James P. Diebold, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 13, 1975, Ser. No. 558,194
Int. Cl.[2] C06D *5/06*
U.S. Cl. 60—219 3 Claims

1. In a method for doing work wherein a gas generating material within a housing is ignited and burned to produce a gas which does said work without damaging said housing by means of heat, the improvement residing in utilizing as said material a composite consisting essentially of a potting material

and one or more pieces of conventional solid rocket propellant potted in said potting material in a way such that said pieces



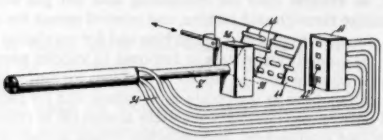
will primarily end burn when ignited and will endothermically pyrolyze sufficient potting material to lower the flame temperature and the oxidativeness of the propellant combustion gases.

4,116,000

ENGINE CONTROL SYSTEM

Anthony Newman Martin, Simsbury; Carl James Buczek, Manchester, both of Conn., and Robert Joseph Mongeon, East Longmeadow, Mass., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 1, 1976, Ser. No. 737,379
Int. Cl.² F02K *1/18*
U.S. Cl. 60—242 **2 Claims**



1. Apparatus for controlling the aperture of a variable area exhaust nozzle of a gas turbine engine, comprising:

an intelligence processing unit positioned remotely from the exhaust nozzle;

a sensing unit located in proximity to the exhaust nozzle and which has incorporated therein a signal encoder operative in response to an optical signal initiated at said intelligence processing unit for sensing the position of the exhaust nozzle;

means for transmitting the initiated optical signal from the intelligence processing unit to the position sensing unit and returning the encoded position signal to the intelligence processing unit; and

actuator means, which is mechanically coupled to the exhaust nozzle and which is responsive to a signal initiated at said intelligence processing unit for setting the aperture area of said exhaust nozzle.

4,116,001

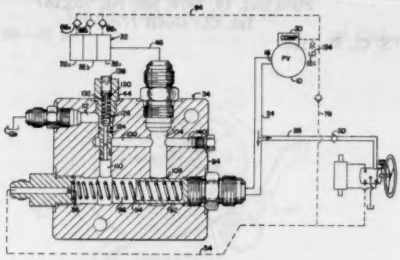
SIMPLIFIED LOAD SENSITIVE HYDRAULIC SYSTEM FOR USE WITH A VEHICLE STEERING SYSTEM

Harold R. Orth, Hinsdale, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed Aug. 1, 1977, Ser. No. 820,518
Int. Cl.² F15B *11/20*
U.S. Cl. 60—420 **3 Claims**

1. In a flow compensated hydraulic system having a variable displacement pump, a priority dependent work circuit, a secondary work circuit and a flow compensating priority valve including a valve body having a plurality of bores, including a first passage and a discharge passage communicating with said first passage therein, a priority valve spool carried in the first passage of said valve body, a priority spool spring urging said priority valve spool to an undisplaced position of repose, the improvement comprising:

a relief valve responsive to pressure in said first passage allowing fluid to flow from said first passage via said discharge passage to said secondary work circuit, said



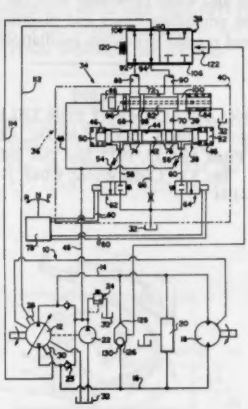
relief valve will remain open and said priority valve spool will be closed when said secondary work circuit does not require fluid flow.

4,116,002

CONTROL FOR A VARIABLE DISPLACEMENT PUMP OR MOTOR

Kenneth K. Knapp, and Charles R. Cornell, both of Battle Creek, Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Aug. 22, 1977, Ser. No. 826,278
Int. Cl.² F16H *39/46*
U.S. Cl. 60—445 **9 Claims**



1. A control for use with a variable displacement pump or motor unit having a pair of strokers into and out of which fluid must be directed to vary the displacement of the unit and having a relatively high pressure fluid conduit and a relatively low pressure fluid conduit, a source of fluid at a relatively high pressure and a source of fluid at a relatively low pressure, said control comprising:

A. control valve means having first and second passages adapted to communicate and be intermediate said sources of fluid and said strokers and operational in response to an input to direct fluid from said high pressure source toward one of said strokers via said first passage and simultaneously from said other stroker to said low pressure source via said second passage to vary the displacement of said unit; and

B. override valve means adapted to communicate and be intermediate said control valve means and said strokers and having a first port adapted for fluid communication with said first control passage, and a second port adapted for fluid communication with said second control passage, a first passage adapted for fluid communication with said

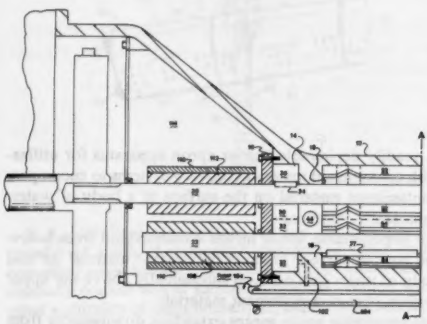
one stroker, a second passage adapted for fluid communication with said other stroker, and means for directing fluid between said first override passage and said first port and simultaneously between said second override passage and said second port and responsive to another input to first restrict said fluid communication and then terminate said fluid communication and during said termination to communicate said first and second override passages.

4,116,003

MULTI-SPEED HYDRAULIC DRIVE TORQUE CONVERTER

Ralph Franklin Walworth, P.O. Box 11711, St. Petersburg, Fla. 33733

Filed Aug. 1, 1977, Ser. No. 820,566
Int. Cl.[2] F16D *39/00*
U.S. Cl. 60—487 7 Claims



1. In a multi-speed torque converter, a housing defining a chamber,

parallel input and output shafts in said housing chamber, said input shaft being driven,

a pair of input gears individually positioned on said shafts with only the gear on the input shaft being secured thereto,

a plurality of pairs of transfer gears journalled on said shafts with one gear of each pair being on one of said shafts,

a pair of output gears individually positioned on said shafts with only the gear on said output shaft being secured to said shaft,

an input and an output gallery being formed in the housing by said gears, and

means operatively positioned in the housing to move pairs of said transfer gears axially to engage said input or said output gears to form an operative gear unit therewith and to retain said transfer gears in their given positions when the converter is in operation;

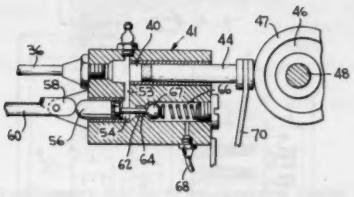
the improvement comprising side pressure vane means slidably positioned in said housing at an end thereof for movement axially of said chamber to extend therefrom and engage side faces of adjacent gears; bore means in the housing connecting to the axially outer surfaces of said vane means, and check valves is said housing for receiving housing chamber pressure and transmitting it to said bore means for urging said vane means axially inwardly of said chamber to press axially against said gears.

4,116,004

HYDRAULIC PULSE GENERATING APPARATUS

William R. C. Geary, 4/18 Kensington Rd., South Yarra, Victoria, Australia (3141)

Division of Ser. No. 549,053, Feb. 11, 1975, Pat. No. 3,988,828.
This application Sep. 20, 1976, Ser. No. 724,535
Int. Cl.[2] F15B *7/02*
U.S. Cl. 60—543 1 Claim



1. Hydraulic pulse generating apparatus comprising a hydraulic master cylinder adapted to be connected to a slave motor, means for providing continuous fluid communication between said master cylinder and the slave motor, a plunger reciprocable in the cylinder to produce successive pressure pulses in the liquid therein, power actuated driving means for the plunger, a hydraulic fluid reservoir communicating with the master cylinder for the supply thereto of fluid under a substantially constant base pressure which is intermediate between the maximum and minimum pressures produced in the master cylinder during operation, a transfer chamber of variable capacity which continuously communicates with the master cylinder, manual control means operable to increase the capacity of the transfer chamber beyond its normal operating capacity by an amount at least equal to the volume of liquid normally displaced by said plunger of the master cylinder whereby when its capacity is thus increased the fluid which is normally pulsed by the plunger towards the slave motor passes into the transfer chamber from the master cylinder thereby to interrupt the transmission of said pressure pulses to the slave motor while said power operated means continues to operate and the master cylinder continuously communicates with the motor, and including valve means for preventing the flow of additional fluid into the cylinder from the reservoir when the capacity of the transfer chamber is thus increased.

4,116,005

COMBINED CYCLE POWER PLANT WITH ATMOSPHERIC FLUIDIZED BED COMBUSTOR

David M. Willyoung, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 6, 1977, Ser. No. 803,530
Int. Cl.[2] F01K *23/00*
U.S. Cl. 60—655 9 Claims

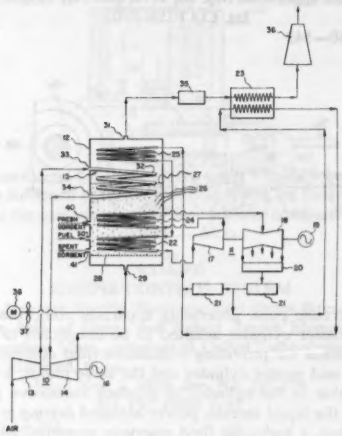
1. A combined cycle steam turbine and gas turbine power plant comprising:

(a) a gas turbine including a compressor section and a turbine section;

(b) a fluidized bed combustor for combustion of carbonaceous sulfur-bearing fuel at nearly atmospheric pressure and in an environmentally clean manner, said combustor having a bed of fluidizable sulfur-sorbing particles, a first inlet for receiving fluidizing and combustion air at nearly atmospheric pressure from the turbine section of said gas turbine, a second inlet for receiving carbonaceous sulfur-bearing fuel, a third inlet for receiving sulfur-sorbing particles, a first outlet for discharge of gaseous and entrained solid particulate products, and a second outlet for discharge of spent sorbing particles and ash solids;

(c) an air heat exchanger within said fluidized bed combustor, said heat exchanger including an inlet for receiving pressurized air from the compressor section of said gas

turbine, heat exchange surface means allowing heating of the compressed air without intermixing of air heat exchanger air and fluidized bed combustor material, and an outlet to direct heated pressurized air out of the fluidized



bed combustor for passage to the turbine section of said gas turbine;

(d) a steam turbine; and

(e) steam generating means in said fluidized bed combustor for furnishing steam to drive said steam turbine.

4,116,006

MODULAR ENGINE ASSEMBLY

Marvin E. Wallis, 5535 Longfellow Rd., Santa Barbara, Calif. 93111

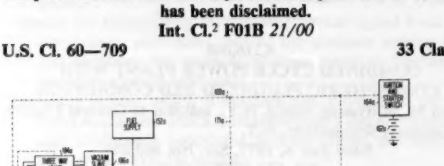
Continuation-in-part of Ser. No. 652,326, Jan. 26, 1976, Pat. No. 4,027,485, and Ser. No. 650,374, Jan. 19, 1976, said Ser. No. 652,326, is a continuation-in-part of Ser. No. 650,374, , which is a division of Ser. No. 557,746, Mar. 12, 1975, Pat. No. 3,949,556.

This application Apr. 12, 1977, Ser. No. 786,897

The portion of the term of this patent subsequent to Jun. 7, 1994, has been disclaimed.

Int. Cl.[2] F01B *21/00*

U.S. Cl. 60—709 **33 Claims**



1. A modular engine assembly for connection with a transmission driven thereby comprising:

a primary engine,

means for starting said primary engine,

an auxiliary engine disposed in tandem with said primary engine,

means adjacent the end of said primary engine remote from said auxiliary engine for connecting said primary engine to the transmission for driving the latter by said primary engine,

means for selectively coupling and decoupling said auxiliary engine and said primary engine one to the other for driving the transmission selectively by said primary engine or both said primary engine and said auxiliary engine, and

means for starting said auxiliary engine including means for storing kinetic energy developed by said primary engine and applying said kinetic energy to said auxiliary engine to assist in starting said auxiliary engine, said kinetic energy storing and applying means being located adjacent the end of said primary engine remote from said auxiliary engine.

4,116,007

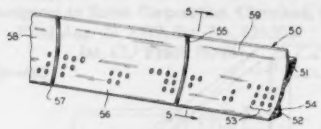
DEPLOYABLE BARRIER APRON APPARATUS FOR USE WITH CONTAMINANT RECOVERY SYSTEMS

Merlin D. Stagemeyer, Northbrook, Ill., and Seth Ford Allcorn, Columbia, Mo., assignors to Oil Spill Recovery, Inc., Northbrook, Ill.

Filed Mar. 21, 1977, Ser. No. 779,676

Int. Cl.[2] E02B *15/04*; B01D *17/02*

U.S. Cl. 405—66 **10 Claims**



1. A readily deployable barrier apron apparatus for utilization with contaminant material recovery systems to encompass said contaminant material on the surface of a body of water, said apparatus comprising:

upper impenetrable apron means which extend from below the bottom surface of said contaminant material on said body of water to a position substantially above the upper surface of said contaminant material;

lower penetrable apron means extending downwardly from said upper apron member from a position beneath the lower surface of said contaminant material for maintaining said apparatus in a generally upright position in said body of water while stabilizing said apparatus when said apparatus is moved through said body of water;

said apron means being divided into a plurality of apron segments hingedly attached to each other for quickly and easily deploying said apparatus in said body of water; and

uprighting flotation means including a lower channel means having an aperture allowing water to enter said channel means and an upper buoyancy means for effectively positioning said apparatus in an upright position in said body of water and for maintaining said apparatus in position in said body of water.

4,116,008

GUTTER MANIPULATING APPARATUS AND METHOD

Edwin J. Ward, 13839 Clifton Blvd., Lakewood, Ohio 44107

Division of Ser. No. 613,444, Sep. 15, 1975, Pat. No. 4,061,151.

This application Jul. 27, 1977, Ser. No. 819,392

Int. Cl.[2] E02B *9/04*

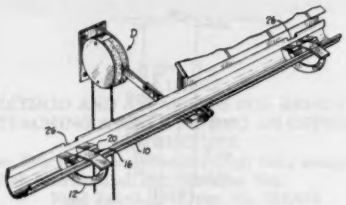
U.S. Cl. 405—119 **3 Claims**

1. A gutter-manipulating apparatus for dumping debris from a gutter, comprising:

(a) structure supporting the gutter for rotation about a longitudinal axis of the gutter; and

(b) means for imparting rotary motion to the gutter about the

longitudinal axis, the longitudinal axis being located within the gutter between its upper edge and its bottom



whereby the radius of rotary motion of the gutter is less than its depth.

4,116,009

COMPLIANT UNDERWATER PIPE SYSTEM

Scott C. Daubin, 115 Sunrise Dr., Key Biscayne, Fla. 33149

Filed Aug. 24, 1976, Ser. No. 717,352
Int. Cl.[2] E02B 9/00
U.S. Cl. 114—264 **11 Claims**

1. A compliant pipe system for use under water for the transfer of fluids therethrough comprising inner and outer compliant pipes having cylindrical surfaces positioned in substantially coaxial and in substantially close relation with each other a plurality of longitudinally separated wall means extending transversely between said cylindrical surfaces forming a plurality of substantially elongated and longitudinally disposed chambers between said pipes for receiving a buoyancy affecting fluid therein, said inner compliant pipe forming a fluid passageway for the transfer of fluid from a lower area to substantially the surface thereof; and wherein each of said compliant pipes consists of a plurality of layers of elastomer material forming a sandwich, each layer consisting of a plurality of strips of elastomer material having substantially high strength filaments embedded therein, said strips of elastomer material bonded together in helices, the helix of one layer spiralling in substantially the opposite direction of at least one other layer; and further comprising a longitudinal layer forming part of said sandwich with said longitudinal layer having said strips of elastomer material extending longitudinally in said compliant pipe; and further in combination with valve means mounted on said cylindrical surface of the outer compliant pipe at the position of each chamber for filling and emptying said chambers of said buoyancy affecting fluid.

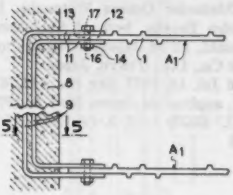
4,116,010

STABILIZED EARTH STRUCTURES

Henri Vidal, 8 bis, Boulevard Maillot, 92 Neuilly-sur-Seine, France

Filed Sep. 24, 1976, Ser. No. 726,436
Claims priority, application France, Sep. 26, 1975, 75 29600
Int. Cl.[2] E02D 5/20
U.S. Cl. 405—262 **11 Claims**

1. A stabilized earth structure comprising a mass of earth, a plurality of reinforcing elements embedded in the mass, said reinforcing elements being elongated and pliable and being capable of sustaining tension without permanently elongating and without fracture, a portion of said earth being in direct frictional engagement with one surface of said reinforcing elements, said one surface having a plurality of ribs spaced apart longitudinally of said element, said ribs having a height of



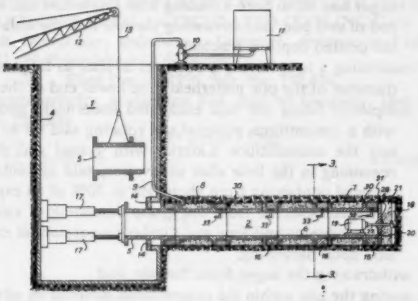
about 3 millimeters, said earth being pressed against said one surface with sufficient pressure to be retained by said ribs and to become an integral part of said reinforcing element, and thereby increasing frictional resistance between said earth mass and said reinforcing elements.

4,116,011

METHOD OF EXCAVATING TUNNELS

Pablo Girault, Volcan 120, Mexico City, Mexico (10)

Filed Jun. 3, 1977, Ser. No. 803,310
Claims priority, application Mexico, Jun. 4, 1976, 164996
Int. Cl.[2] E21D 11/10
U.S. Cl. 405—134 **6 Claims**



1. A method of excavating tunnels wherein a casing is gradually pushed inwardly of the excavation as the excavation front advances, which comprises the steps of

excavating a tunnel having a cross-sectional area larger than the outer cross-sectional area of the casing;

placing the casing concentrically of the excavation at the open mouth thereof to be pushed inwardly of said excavation to thereby leave an annular chamber between the outer wall of the casing and the surface of the excavation;

gradually pushing the casing inwardly of the excavation as the excavation front advances;

placing at least a seal between the outer wall of the casing and the wall of the excavation at the innermost end of the casing and another seal between the outer wall of the casing and the wall of the excavation at the mouth of said excavation in order to form a closed annular chamber;

injecting a sufficient amount of drilling fluid under pressure into said chamber such that the casing is floated in said drilling fluid and the walls of the excavation will be spaced from the wall of the casing by a thick layer of said fluid thus eliminating friction stresses between the casing and the excavation;

and then continue to push the casing inwardly of the excava-

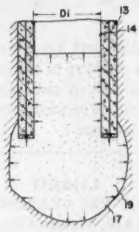
tion while maintaining the pressure of the fluid in said chamber as the excavation front advances.

4,116,012

METHOD OF OBTAINING SUFFICIENT SUPPORTING FORCE FOR A CONCRETE PILE SUNK INTO A HOLE

Nobuyuki Abe, Matsudo; Osamu Watanabe, Iwatsuki; Koji Nunokawa; Ichiro Tanaka, both of Kamakura, and Masao Manabe, Kawasaki, all of Japan, assignors to Nippon Concrete Industries Co., Ltd., Tokyo, Japan

Filed Jul. 14, 1977, Ser. No. 815,767
Claims priority, application Japan, Nov. 8, 1976, 51-133257
Int. Cl.[2] E02D *5/38, 5/44;* E21C *17/00*
U.S. Cl. 405—238 **10 Claims**



1. A method for setting a concrete pile and obtaining secure support for the lower end of the pile which comprises:

inserting a screw auger having a bit at the forward end thereof through a hollow concrete pile and rotating said auger and bit to bore a leading hole just below the lower end of said pile, and advancing the pile into the hole until the desired depth is reached;

excavating a hole having a diameter at least as large as the diameter of the pile underneath the lower end of the pile;

completely filling the hole excavated underneath said pile with a cementitious material and rotating said bit so as to mix the cementitiuos material with gravel and debris remaining in the hole after excavation, said cementitious material containing from about 5% to 30% of an expanding agent selected from the group consisting of calcium sulfoaluminate and lime and displaying substantial expansion upon hardening;

withdrawing the auger from the pile, and

seating the pile within the cementitious material by advancing the pile a short distance downwardly into said material to further compact the cementitious material below the lower end of the pile and to obtain a secure support for the pile as the cementitious material expands upon hardening.

4,116,013

UNDERWATER PILING RESTORATION SYSTEM

Emil Donald Hellmers, 6414 Bayshore Walk, Long Beach, Calif. 90803

Filed Dec. 27, 1976, Ser. No. 754,631
Int. Cl.[2] E02D *5/60*
U.S. Cl. 405—216 **10 Claims**

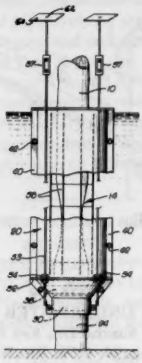
1. The method of casting a concrete splint about a deteriorating underwater section of a pile which comprises:

(a) affixing about the pile at a level beneath the deteriorating section, a first seal member having a downwardly facing sealing element;

(b) placing about the said section and said first seal member, a split elongated hollow form having at its lower end a seal member having an upwardly facing second element opposed to said sealing element of said first seal member;

(c) supporting said hollow form from above the water level;

(d) pumping the water from the form to allow buoyancy forces firmly to establish a sealing relationship between said seal members;



(e) pouring concrete mix into the form while the form is maintained relatively dry;

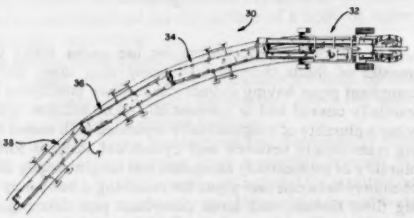
(f) thereafter removing the form.

4,116,014

EXCAVATING AND PIPELINE INSTALLATION SYSTEM

Charles R. Satterwhite, Dallas, Tex., assignor to Unit Rig and Equipment Co., Tulsa, Okla.

Filed May 6, 1976, Ser. No. 683,970
Int. Cl.[2] E02F *5/08;* F16L *1/02*
U.S. Cl. 405—179 **29 Claims**



1. An excavating and pipeline installation system comprising:

a vehicle adapted for movement over a surface of the earth and including a frame having a front end and a rear end;

means supporting the frame for movement along the surface;

an excavating wheel assembly for excavating a pipeline receiving trench at a predetermined location beneath the surface of the earth, said assembly having two rigid excavating wheels mounted in a V-shaped array, said wheels being supported by the frame for rotation about angularly disposed axes and being connected to the front end of the frame for engagement with material to be excavated;

each of the excavating wheels including a plurality of digging buckets each having a cutting edge which extends to a stationary wall and a wall mounted for pivotal movement from a material receiving position to a material dumping position;

means mounted on the frame for first positioning the pipeline directly above the predetermined location, between the excavating wheels and above the axes of rotation thereof and for thereafter positioning the pipeline within the pipeline receiving trench;

main conveyor means mounted on the frame for transporting the excavated material rearwardly and upwardly from the excavating wheels to the rear of the vehicle; and

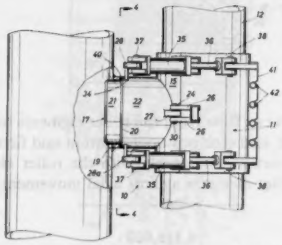
means for actuating the supporting means to propel the vehicle and for actuating the main conveyor means.

4,116,015

METHOD AND APPARATUS FOR REMOTELY ATTACHING A RISER PIPE TO AN OFFSHORE STRUCTURE

Anthony Bruce Duncan, Missouri City, Tex., assignor to HydroTech International, Inc., Houston, Tex.

Filed Jan. 3, 1977, Ser. No. 755,474
Int. Cl.² F16L *41/00*
U.S. Cl. 405—169 **2 Claims**



1. In apparatus for attaching a riser pipe to an offshore structure, the combination comprising:
an arcuate seat having a radius of curvature substantially equal to that of said pipe;
means for rigidly mounting said seat to said structure;
a pair of arcuate jaws each having a radius of curvature substantially equal to that of said pipe hingedly attached to said arcuate seat for movement between an open position to receive said pipe and a closed position to hold said pipe to said structure;
power means for moving said arcuate jaws between said open position and said closed position;
and locking means for locking said arcuate jaws in said closed position.

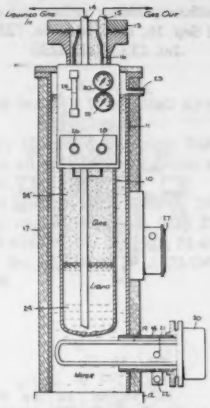
4,116,016

CORROSION-RESISTANT LIQUIFIED GAS EVAPORATOR

Robert Roop, Doylestown, and Carl Shine, Philadelphia, both of Pa., assignors to Fischer & Porter Co., Warminster, Pa.

Filed Mar. 8, 1977, Ser. No. 775,524
Int. Cl.² F17C *7/02*
U.S. Cl. 62—52 **3 Claims**

1. An evaporator for vaporizing a liquified gas such as chlorine, said evaporator comprising:
A. a water vessel having a heater therein to raise the temperature of the water to a degree sufficient to effect vaporization of liquified gas;
B. a vapor tank supported within said vessel and surrounded by said heated water, said tank having a steel wall possessing high heat transfer characteristics;
C. means to supply the liquified gas into the tank to be vaporized by heat transferred from the water through the steel wall, said steel wall having an outer surface coated by a layer of sintered tetrafluoroethylene powders that adhere to the surface, said layer having a thickness in the range of 4 to 6 mils just sufficient to render it impermeable to the water but insufficient to materially reduce the heat transfer characteristics of the steel wall, thereby inhibiting



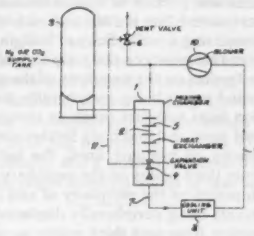
corrosion of the outer surface and the formation of scales thereon without the loss of heat energy.

4,116,017

METHOD OF AND APPARATUS FOR THE COOLING OF ARTICLES WITH A CIRCULATED COOLING GAS

Jakob Oberpriller, Baierbrunn, Germany, assignor to Linde AG., Hollriegelskreuth, Germany

Filed Dec. 3, 1976, Ser. No. 747,404
Claims priority, application Fed. Rep. of Germany, Dec. 6, 1975, 2554906
Int. Cl.² F25D *17/06*
U.S. Cl. 62—62 **8 Claims**

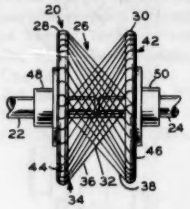


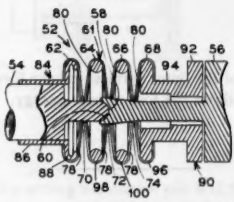
1. A process for the deep cooling of an article which comprises the steps of:
circulating a cooling gas along a closed path through an enclosure;
contacting said article with the circulated cooling gas downstream of said enclosure at a relatively low temperature, thereby warming said cooling gas;
injecting a liquid coolant from a storage facility into said enclosure through an expansion valve to merge with the warmed cooling gas and reduce the temperature thereof upon expansion of the injected coolant, the coolant being stored at said facility under a pressure higher than that of said enclosure; and
supplying heat to the coolant on its way from said facility to said expansion valve in a quantity corresponding only to the vaporization enthalpy of said coolant.

4,116,018
UNIVERSAL JOINT

Warren W. Weible, Defiance, Ohio, assignor to The Zeller Corporation, Defiance, Ohio

Filed Sep. 16, 1976, Ser. No. 723,770
Int. Cl.[2] F16D 3/30
U.S. Cl. 64—12 11 Claims





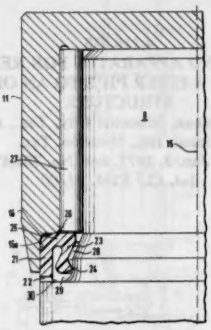
1. A universal joint for transmitting torque from one shaft to another at substantially constant angular velocity, said universal joint comprising a first member having means for attaching a central portion thereof to one of said shafts, a second member having means for attaching a central portion thereof to the other of said shafts, said members being in spaced relationship and positioned to rotate in substantially parallel planes perpendicular to the axes of said shafts when said shafts are aligned, a body which is substantially circular in transverse cross section and has one end connected to said first member and another end connected to said second member, said body having at least one intermediate portion of large diameter between said members and at least one portion of smaller diameter between said large diameter intermediate portion and each of said members, said body comprising a multiplicity of bridging lines, said lines extending from first points on the periphery of one of said members to second points on the periphery of the other of said members, said second points being peripherally displaced in a clockwise direction from said first points as viewed from one end of the universal joint, and said body further comprising an additional multiplicity of bridging lines, the last-mentioned lines extending from third points on the periphery of said one member to fourth points on the periphery of said other member, said fourth points being peripherally displaced in a counterclockwise direction from said third points as viewed from the same end of the universal joint.

4,116,019
BEARING ELEMENT SEAL FOR A UNIVERSAL JOINT

Hans-Heinrich Welschof, Odenwaldstrasse 26, 6451 Rodenbach 1, Fed. Rep. of Germany, assignor to Löhr & Bromkamp GmbH, Offenbach am Main, Fed. Rep. of Germany

Filed Aug. 13, 1976, Ser. No. 714,232
Claims priority, application Fed. Rep. of Germany, Aug. 13, 1975, 2536113
Int. Cl.[2] F16D 3/30, 3/41
U.S. Cl. 64—17 A 5 Claims

1. A device for sealing relative to a trunion of a universal joint and a bearing element surrounding a trunnion pin having roller bearings adjacent thereto, and comprising a sealing ring of substantially U-shaped cross-section having first and second legs interconnected by a web, said sealing ring consisting of a resilient material, there being a first annular shoulder on a bearing element and a second annular shoulder on a trunnion pin, said sealing ring first leg supported between said shoulders to position the sealing ring axially, said second leg having a sealing lip resiliently engaging the trunnion pin such that any

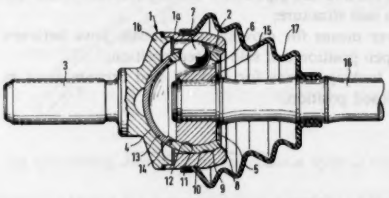


excess lubricant can flow from the roller elements to the exterior of the joint, said web positioned within said first shoulder and having a portion engageable with the roller elements to restrain said roller elements against axial movement.

4,116,020
CONSTANT VELOCITY UNIVERSAL JOINT

Erich Aucktor, Offenbach am Main, and Wolfgang Rubin, Hanau, both of Fed. Rep. of Germany, assignors to Lohr & Bromkamp GmbH, Offenbach am Main, Fed. Rep. of Germany

Filed May 21, 1976, Ser. No. 688,831
Claims priority, application Fed. Rep. of Germany, May 22, 1975, 2522670
Int. Cl.[2] F16D 3/30
U.S. Cl. 64—21 15 Claims



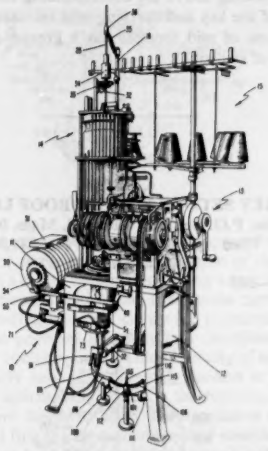
1. A constant velocity universal joint comprising an outer joint element having a cavity therein with a surface and a plurality of grooves in meridial planes in said cavity surface, an inner joint element within said cavity having a spherical outer surface and having a plurality of grooves in meridial planes in said outer surface corresponding in number to said outer joint element grooves to define pairs of opposed grooves, a plurality of balls between said joint elements with each ball being in a pair of opposed grooves, means between said joint elements for retaining said balls and having a first spherical surface on its outer face and a second spherical surface on its inner face, said cavity surface of said outer joint element co-acting with said ball retaining means first spherical surface and said inner joint element spherical outer surface co-acting with said ball retaining means second spherical surface to retain said balls in a plane which bisects the angle between the joint elements, said cavity surface having a non-undercut configuration in an axial direction with respect to one end of said outer joint element, and means on said one end of said outer joint element for maintaining said ball retaining means in co-acting relationship with said cavity surface.

4,116,021

HOSIERY HANDLING APPARATUS AND METHOD

John D. Harrill, Shelby, N.C., assignor to Marvel Specialty Company, Hickory, N.C.

Filed Aug. 19, 1977, Ser. No. 827,269
Int. Cl.[2] D04B 15/88, 27/34, 35/00
U.S. Cl. 66—149 S 29 Claims



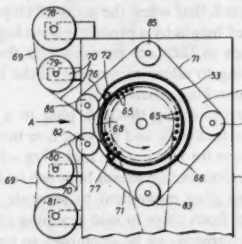
1. In a circular knitting machine having a circular knitting head for knitting a depending string of tubular material, a positioning tube suspended in the machine below the circular knitting head about which the material is knitted and means for turning the material into lower the end of the tube during continuous the knitting operation.

4,116,022

DEVICE FOR PRINTING ON WEBS OF TEXTILE MATERIAL

Karl Peter Lopata, and Günter Schiffer, both of Krefeld, Fed. Rep. of Germany, assignors to Kleinewefers Industrie-Compagnie GmbH, Krefeld, Fed. Rep. of Germany

Filed Aug. 30, 1976, Ser. No. 718,620
Claims priority, application Fed. Rep. of Germany, Sep. 1, 1975, 2538795; Sep. 17, 1975, 2541448
Int. Cl.[2] B41M 5/26
U.S. Cl. 68—5 D 4 Claims



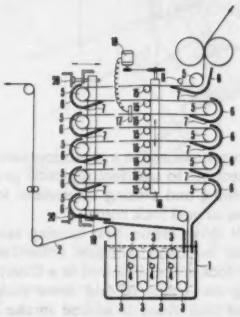
1. In a combination with an apparatus for printing upon webs of textile material by sublimation of the dye of printing foil web, which includes a rotatable cylinder having an axis, means for looping a web of textile material and of a printing foil web and a belt around said cylinder, a heating device in said cylinder, a tubular wall surrounding the cylinder in spaced relationship and with side walls forming a chamber around the cylinder and being connected with a vacuum source and provided with inlet and outlet means for the textile material, the foil web and the belt, one side wall of said vacuum chamber being formed as by welding, the other side wall being detachably connected in an airtight manner to the tubular wall, and an endless compressible sealing means surrounding the inlet and outlet means.

4,116,023

CONTINUOUS WATER WASHING APPARATUS FOR CLOTH

Yoshikazu Sando; Hiroshi Ishidoshiro; Takashi Tsuchihashi, and Keiji Saika, all of Wakayama, Japan, assignors to Sando Iron Works Co., Ltd., Japan

Filed May 19, 1977, Ser. No. 798,354
Claims priority, application Japan, May 27, 1976, 51-61482; May 27, 1976, 51-61483; May 27, 1976, 51-61484
Int. Cl.[2] D06B 3/12, 23/04
U.S. Cl. 68—13 R 4 Claims



1. A continuous water washing apparatus for cloth comprising a pre-washing tank, first multi-layer guide rolls and pressurized air blow out pipes located within said tank, second multi-layer guide rolls arranged above said tank in a staggered manner and in two laterally spaced vertical columns for pulling the cloth upwardly from said tank and shifting the cloth horizontally in a zigzag manner over said second guide rolls, a water receptacle provided at and below each of said second guide rolls in the vertical columns, a cleaning water supply volume adjusting mechanism connected to the uppermost said water receptacle said cleaning water supply volume adjusting mechanism including a cloth shifting speed detection mechanism, another mechanism including a tension detection mechanism and a cloth sag prevention member to hold the shifting cloth horizontally, and a cloth width detection mechanism for adjusting the water filled up width of said water receptacles.

4,116,024

ANTI-THEFT DEVICE FOR MACHINES EQUIPPED WITH A DIESEL OR LIKE ENGINE

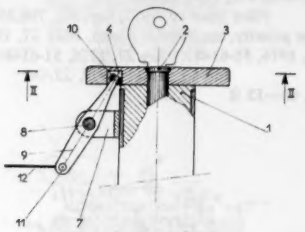
Paul Lipschutz, Croissy, France, assignor to Neiman S.A., Courbevoie, France

Filed May 3, 1977, Ser. No. 793,411
Claims priority, application France, May 21, 1976, 76 15316
Int. Cl.[2] B60R 25/02, 25/04
U.S. Cl. 70—201 2 Claims

1. In an anti-theft device for a vehicle having an internal combustion engine and a fuel injection pump, comprising a body, a lock rotor rotatable within said body about an axis, a locking bolt operable by said lock rotor to be moved between locking and unlocking positions in which it locks and unlocks respectively an element of the vehicle essential to the safe operation of that vehicle, an electrical switch operable by said lock rotor and adapted for connection in a circuit starting said vehicle, and locking bolt drive means operable by said lock rotor, the provision of

(a) a drive plate provided exteriorly to said body connected to said lock rotor and perpendicular to the axis thereof having a cam groove formed on that side of said plate which is adjacent the body, said groove lying outside the body and a portion of which groove is eccentric to the axis of rotation of the lock rotor, said grooved side being in a flat plane seating on said body; and

(b) a lever pivotably mounted between its ends on the outside of said body about an axis at right angles to the rotor axis between the ends of said body, one end of said lever being in engagement with said groove and the other end being movable substantially linearly in a direction at right



angles to the rotor axis and in a plane containing said rotor axis and connectible to said fuel injection pump to transmit pump opening and closing movement to said pump upon operation of said lock rotor,

said locking bolt drive means first causing said bolt to be moved to said unlocking position before said pump is opened as the lock rotor is moved in a direction to cause pump opening movement of said drive plate and lever, and when said lock rotor is moved in the direction to cause pump closing movement of said drive plate and lever, first causing said pump to be closed before said bolt is moved to said locking position.

4,116,025

REVERSIBLE FLAT KEY FOR CYLINDER LOCKS

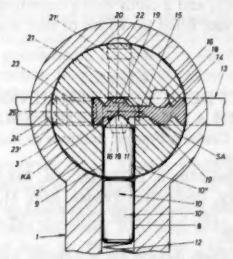
Heinz Wolter, Kürten, Fed. Rep. of Germany, assignor to DOM-Sicherheitstechnik GmbH & Co. KG, Brühl, Fed. Rep. of Germany

Filed Dec. 12, 1977, Ser. No. 859,372

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1976, 2658495

Int. Cl.² E05B *19/04, 27/06*

U.S. Cl. 70—358 **4 Claims**



1. A reversible flat key for cylinder locks having rows of recesses arranged in opposite wide faces of the key for bringing tumbler pins of the cylinder lock into the correct position, comprising

a flat key having opposite wide faces and a tip,

a rib formed on each of said wide faces of the key projecting thereabove defining a rear face, said rib being formed with a plurality of recesses constituting a row of recesses,

said key is formed with lead-in bevels in the region of said tip of the key in alignment with a respective of said row of recesses, each of said lead-in bevels extends inclined into the respective of said opposite wide faces of the key,

each of said lead-in bevels runs out into said rear face of said rib projecting above the corresponding each of said wide faces of the key and carrying said recesses, and

at least one of said recesses has a greater depth than the height of said rib.

4,116,026

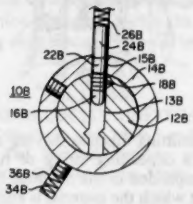
KEY SETTABLE, PICK PROOF LOCK

Orin Q. Flint, P.O. Box 536, Linwood, Mass. 01525

Filed Apr. 14, 1977, Ser. No. 787,307

Int. Cl.² E05B *25/00*

U.S. Cl. 70—383 **5 Claims**



1. Key settable, pick-proof lock, comprising, in combination,

means forming a movable key plug with a locking channel,

means defining at least one array of a plurality of key chips movably mounted within said locking channel for resting on a land of a key inserted into said channel,

means defining a movable lock plug with a channel therein

means defining surrounding lock body structure containing said key plug and lock plug,

means forming a lock pin movably arranged within said lock plug channel and being movable between a first position extending partly out of said lock plug channel and engaging the body to lock the lock plug and a second position wholly within the channel to unlock the lock plug,

first means-for-interconnecting the key chips with the locking channel such that when the array of chips is moved to predetermined height by a predetermined key land height, then the chips in turn act through said first means-for-interconnecting to allow movement of the lock pin from locking to unlocking position,

means for interconnecting the lock plug to a latch so that unlocking the lock plug and moving it in turn releases the latch and means for moving the lock plug when unlocked,

lost motion interconnection means between said plugs allowing initial key plug movement to separate chips in said body channel from chips in said key plug channel before lock plug movement can be attempted to test the control key image of chips stacked in the body channel, the chips having a control key image that works in response to correct service key insertion in the key plug,

means in said lock body structure for storing chips, and,

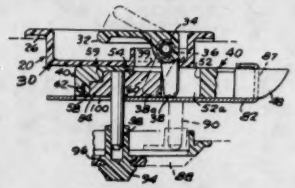
second means-for-interconnecting said storage means and key plug channel for chip transfer to change the lock setting,

said second means-for-interconnecting being operable by a present correct service key and accomodatable to a new service key to effect such chip transfer.

4,116,027
DOOR LOCK

Edward F. Tannery, Coldwater, Mich., assignor to Theodore Bargman Company, Coldwater, Mich.

Filed Jun. 9, 1977, Ser. No. 805,099
Int. Cl.[2] E05B *55/04*
U.S. Cl. 70—472 20 Claims

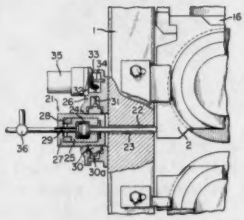


1. A door lock comprising a frame, an elongate belt disposed in said frame for movement in the direction of the bolt axis, said bolt having a cavity therein and having a nose end extending outwardly beyond said frame, first means carried by said frame and extending into said cavity for movement between first and second positions generally in a direction parallel to said bolt axis, a latch disposed to slide laterally of said bolt axis within said cavity between an unlock position in which said latch is aligned with said first means in the direction of said bolt axis for abutment therewith such that movement of said first means from said first to said second position results in conjoint movement of said latch and said bolt to retract said bolt and a lock position in which said latch is spaced from said first means laterally of said bolt axis in both said first and second positions of said first means, and means for selectively positioning said latch in either said lock or said unlock position.

4,116,028
ROLLING MILL

Toyohiko Okamoto, Toyonaka; Yoshisuke Misaka, Takarazuka, and Motoo Asakawa, Minoo, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 738,061, Nov. 2, 1976, abandoned. This application Jul. 18, 1977, Ser. No. 816,734
Int. Cl.[2] B21B *37/06*
U.S. Cl. 72—21 20 Claims

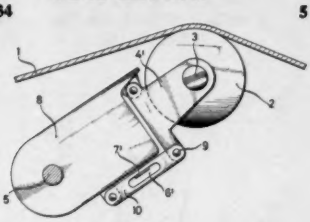


14. Load sensing device for measurement of a force in a workpiece extending between adjacent two roll stands each of which includes a frame, at least a pair of work rolls and work roll chocks for supporting the work rolls respectively, comprising a housing adapted to be mounted on the frame of one of the adjacent two roll stand, load sensing rod means having one end adapted to be contacted with one of the work roll chocks of said one roll stand, transducer means associated with said load sensing rod means so as to receive a force axially transmitted through said rod means for generating an electric signal representing the force, means for effecting axial movement of said rod means into and out of contact with said one work roll, and hydraulic means including hydraulic cylinder means and piston means disposed in said cylinder means, said piston means being adapted to support said rod means under a predetermined hydraulic pressure so that when a force acting on through said rod means exceeds said predetermined pressure, said piston moves to prevent such an excessive force from being applied to said transducer means.

4,116,029
DEVICE FOR MEASURING THE FLATNESS OF METAL STRIPS

Wolfgang Fabian; Hermann-Josef Kopineck, and Wilhelm Tappe, all of Dortmund, Germany, assignors to Hoesch Werke AG, Dortmund, Germany

Filed Jun. 2, 1977, Ser. No. 802,948
Claims priority, application Fed. Rep. of Germany, Jul. 24, 1976, 2633351
Int. Cl.[2] B21C *51/00*
U.S. Cl. 72—34 5 Claims

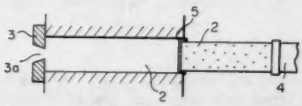


1. An arrangement for measuring the flatness of metal strips under tensile stress while being rolled, comprising: measuring roller means; measuring elements; means for carrying said measuring elements and having side members; bearing means on said side members and supporting said measuring roller means; pivot means supporting said side members, said side members being swivable about said pivot means; rigid box means reinforcing said pivot means; said means for carrying said measuring elements including cover plate means having a recess for holding said measuring element and being attached to a side of said box means; said side members being T-shaped and being pivotably connected to said box means and being pivotally connected to said cover plate means, said side members absorbing a substantial amount of force transmitted by said roller means to said side members for reducing substantially the amount of force applied to said measuring elements.

4,116,030
METHOD OF MAKING PROFILED WORK OF ALUMINUM OR ALUMINUM ALLOY BY EXTRUDING PROCESS

Yoshiyuki Kobayashi, and Shigeru Okaniwa, both of Fuji, Japan, assignors to Kabushikikaisha Nippon Keikinzoku Sogokenkyusho, Tokyo, Japan

Filed Apr. 21, 1977, Ser. No. 789,734
Claims priority, application Japan, Apr. 23, 1976, 51-45323
Int. Cl.[2] B21C *23/32, 35/06*
U.S. Cl. 72—40 16 Claims



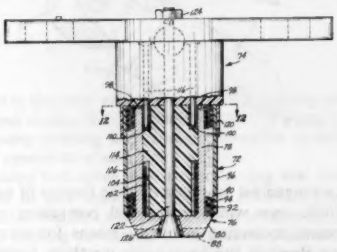
1. In a method of making a profiled work of aluminum or aluminum alloy by an extruding process including the steps of loading a billet of aluminum or aluminum alloy into a container having an extruding die formed with at least one extruding hole of required configuration mouned at one end thereof, and

moving a ram into said container from the opposite end thereof so as to urge said billet against said extruding die thereby permitting said billet to be extruded through said extruding hole so as to form a profiled work having its cross-section conforming with the configuration of said extruding hole, the improvement comprising locating a preformed abrasive containing disc of aluminum or aluminum alloy between said extruding die and said billet prior to extruding said billet through said extruding hole said disc containing at least one element selected from the group consisting of elements B, Be, Ti, Zr, W, Mo and V, said element forming very hard and fine particles acting as the abrasive.

4,116,031
FLUX CONCENTRATOR FOR ELECTROMAGNETIC PULLING

Karl A. Hansen, and I. Glen Hendrickson, both of Seattle, Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Dec. 20, 1976, Ser. No. 752,755
Int. Cl.[2] B21D *26/14*
U.S. Cl. 72—56 **15 Claims**



1. A flux concentrator for electromagnetic pulling of a conductive material comprising: a first primary coil wound around an outer surface of a single turn secondary coil, said secondary coil having means for concentrating flux to exert electromagnetic force in an axial direction with respect to the secondary coil; a second primary coil wound adjacent an inner surface and an end of the secondary coil wherein the inside surface of the secondary coil has integral spirally formed radial grooves into which the second primary coil is wound; means for introducing a slow rise high amplitude electrical current to the first primary coil; means for quickly shutting off the slow rise high amplitude current; and means for introducing a timed fast rise reversed polarity electrical current to the second primary coil to generate an axially directed pulling electromagnetic flux at the secondary coil.

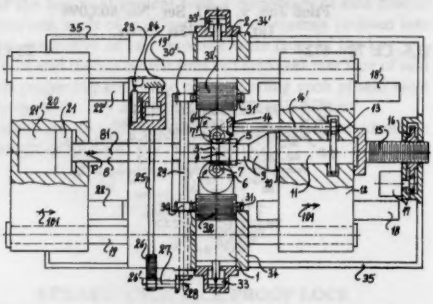
4,116,032
METHOD AND APPARATUS FOR MANUFACTURING STRAIGHT OR INCLINED TOOTHED MACHINE ELEMENTS, ESPECIALLY SPUR GEARS BY COLD WORKING

Hans Krapfenbauer, Zurich, and Ernst Grob, Meilen, both of Switzerland, assignors to Ernst Grob, Mannedorf, Switzerland

Filed Jun. 15, 1977, Ser. No. 806,830
Claims priority, application Switzerland, Jun. 30, 1976, 8332/76
Int. Cl.[2] B21H *5/02*
U.S. Cl. 72—68 **17 Claims**

1. A method of manufacturing straight or inclined toothed machine elements, especially spur gears, by cold working, comprising the steps of:

retaining under axial prestress an individual gear-workpiece blank which is in a cold condition during a cold rolling operation between two press punches in order to essentially prevent any appreciable flow of material of the blank in its axial direction and at such a pressure that under the action of the cold rolling operation there occur pressure stresses between the press punches and the workpiece, these pressure stresses corresponding to at least the elastic limit of the material of the workpiece; and

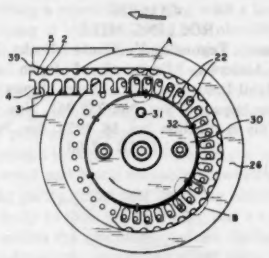


forming at least at one of both end surfaces of the workpiece an end surface disposed exactly perpendicular to the lengthwise axis of the workpiece due to the simultaneous action of the prestressing force and the rolling operation.

4,116,033
METHOD AND APPARATUS FOR FORMING A WOUND CORE

Yoshiyuki Iwaki, and Ryozo Kuroda, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 26, 1977, Ser. No. 790,913
Claims priority, application Japan, Dec. 28, 1976, 51-159950
Int. Cl.[2] H02K *15/00*; B21D *11/06*
U.S. Cl. 72—142 **5 Claims**



1. A method for helically winding a core element comprising the steps of:

providing a strip having a solid portion with a plurality of teeth extending therefrom with slots between the teeth;

providing a pin having a shank of diameter smaller than the width of the slots between the teeth included in the strip;

reciprocating the pin along its axis;

engaging the shank of the pin inside a slot formed by a pair of teeth included in the strip;

rotating the pin about a fixed point;

providing a mandrel having a key;

engaging, simultaneously with the engagement of said pin shank in said slot, the key of the mandrel between forward edges of said pair of teeth included in the strip to position the center of said key at a predetermined angle relative to the center of said pin shank; and

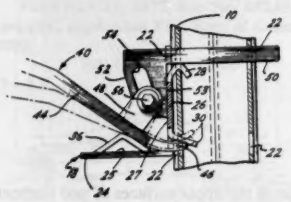
rotating the mandrel about the fixed point simultaneously with the step of rotating the pin to impart local stresses in the solid portion of the strip as the strip is helically wound about the fixed point.

4,116,034

TOOL FOR ASSEMBLING STORAGE SYSTEM

Frederick Ruediger, Willow Grove, Pa., assignor to Standard Pressed Steel Co., Jenkintown, Pa.

Division of Ser. No. 668,369, Mar. 19, 1976, Pat. No. 4,041,600.
This application May 26, 1977, Ser. No. 800,768
Int. Cl.[2] B21D 7/06
U.S. Cl. 72—387 4 Claims



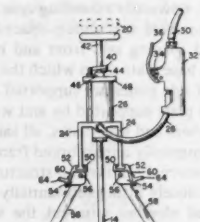
1. A tool for use with a support member having a hook member engaged in a slot on a support post and a bendable tab member inserted in another slot on the support post, said tool comprising an elongated member having a handle portion at one end, a bending finger at the other end, and a portion protruding from said elongated member between the ends thereof, and a reaction finger having opposite planar faces and an ear extending at a right angle from said planar faces toward said elongated member, said reaction finger extending beyond said bending finger, one of said planar faces being adjacent said bending finger and said bending finger being curved in a direction toward said one planar face, said ear being formed with a slot for receiving a pivot pin carried on said protruding portion whereby said reaction finger is capable of translation and is pivotable with respect to said protruding portion, and whereby said reaction finger is adapted to be inserted into said support post slot and overlie said hook member, and said bending finger is adapted to be inserted in said another slot so that a bending force can be applied to said tab member by said bending finger and a reaction force is provided on said reaction finger.

4,116,035

DENT PULLER

Frank Malarsky, 27 Chamberlain Pkwy., Worcester, Mass. 01602

Filed Sep. 8, 1977, Ser. No. 831,493
Int. Cl.[2] B21C 1/12
U.S. Cl. 72—389 5 Claims



1. A dent puller comprising an inverted solid single U-shaped bracket, said bracket including legs, means on said bracket midway between the legs of the U, for holding a slidable dent puller rod thereon, said dent puller rod extending through said bracket and having a handle at one end and a dent puller tool at the opposite end thereof,

mechanical means for retracting said dent puller by increments, and a cockable washer on said rod automatically acting to prevent motion of the dent puller rod in the opposite direction,

said mechanical means for moving said dent puller rod in increments being under control of the operator,

a pair of separate extension legs, means on each leg of the U-shaped bracket to receive and detachably hold one of said extension legs, said extension legs diverging and being adapted to straddle a larger dent than could be straddled by the U-shaped bracket,

means mounted said extension legs relative to the respective bracket leg for pivotal motion thereon,

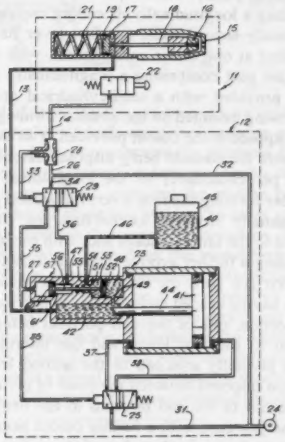
and means restraining said pivotal motion in a direction separating the extension legs.

4,116,036

HYDRAULICALLY OPERATED RIVETING APPARATUS

David John Sheffield, Hemel Hempstead, and John William Charles Saxon, Sawtry, both of England, assignors to Aerpat A.G., Zug, Switzerland

Filed Apr. 11, 1977, Ser. No. 786,192
Claims priority, application United Kingdom, Apr. 12, 1976, 14767/76
Int. Cl.[2] B21J 15/22
U.S. Cl. 72—391 2 Claims



1. In or for hydraulically operated riveting apparatus in which operation of the riveting head is effected by the application of hydraulic pressure to the riveting head, hydraulic pressure generation apparatus which includes

a hydraulic pressure generator for generating hydraulic pressure;

a hydraulic conduit connecting the generator to the riveting head for feeding hydraulic pressure from the generator to the head;

a reservoir for hydraulic fluid;

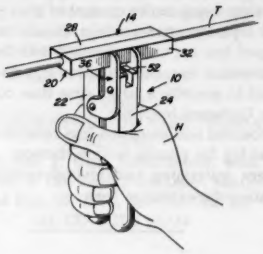
valve means operable to open and thereby connect the hydraulic conduit and the pressure generator to the reservoir and to close and thereby to disconnect the hydraulic conduit and the pressure generator from the reservoir;

and valve control means for causing the valve means to close at the start of each application of hydraulic pressure by the generator and to open at the cessation of each application of hydraulic pressure by the generator.

4,116,037
TUBING SIZER AND STRAIGHTENER

Hugh A. Honeycutt, Rte. 1, Box 877, Los Lunas, N. Mex. 87031

Filed Jun. 28, 1977, Ser. No. 810,794
Int. Cl.[2] B21D 3/00
U.S. Cl. 72—409 7 Claims



1. A tubing sizer and straightener, comprising, in combination:

(a) a first lever and a second lever:

(b) a first jaw part and a second jaw part; and

(c) linkage means pivotally connected to the first lever, and the second lever for connecting the same to one another for sequentially moving the first jaw part and second jaw part toward and away from one another such that the first jaw part and second jaw part will abut one another along a common plane, each of the first lever and second lever including a longitudinally extending member having longitudinally spaced ends, the first lever having a cutout provided at one of the ends thereof, with the associated first jaw part comprising a longitudinally extending element provided with a semi-cylindrical groove, the element being mounted on the member forming the first lever and disposed in the cutout provided at an end of the member, with the element being disposed extending longitudinally perpendicularly to the longitudinal extent of the member forming the first lever, the second jaw part being substantially identical to the first jaw part, and being affixed to the linkage means and, with the second jaw part including a further groove disposed facing the groove of the first jaw part, the linkage means including a curved piece having spaced end portions joined by an intermediate portion, one of the end portions being pivotally attached to the first lever, and the intermediate portion being pivotally attached to the second lever at a point thereon disposed between the point of pivotal attachment of the one of the end portions to the first lever and the second jaw part, with a further cutout being provided on the curved piece in the other of the end portions, and the second jaw part being disposed at the other of the end portions of the curved piece and arranged received in the further cutout.

4,116,038
APPARATUS FOR SHAPING SHEET MATERIAL

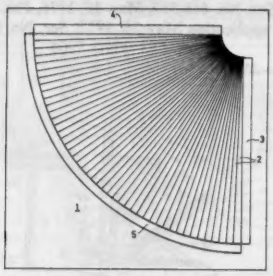
Knud Vilhelm Berthou, Lystbaadeves 12, DK-4000 Roskilde, Denmark

Filed Mar. 21, 1977, Ser. No. 779,586
Claims priority, application Denmark, Mar. 23, 1976, 1269/76
Int. Cl.[2] B21D 37/10
U.S. Cl. 72—413 8 Claims

1. Apparatus for manufacturing a ship propeller, comprising upper and lower cooperating shaping means each including

(a) a base member; and

(b) a plurality of contiguous surface forming elements mounted on said base member, each of said elements having the configuration of the sector of a cylinder, the heights of successive elements being progressively gradu-



ated to cause the upper surfaces of said elements to define a helicoidal shaping surface

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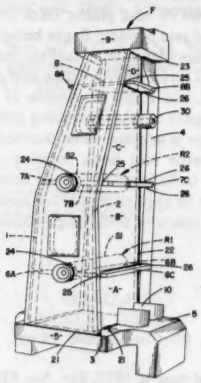
4,116,039
DROP HAMMER FRAME WELDMENT AND ASSEMBLY

Joseph A. Geuss, Alliance, Ohio, assignor to Amca International Corporation, Hanover, N.H.

Filed Mar. 9, 1977, Ser. No. 776,088
Int. Cl.[2] B21J 7/06
U.S. Cl. 72—455 18 Claims



1. A drop hammer frame element comprising in combination an upright front member carrying the gib for guiding the ram, an upwardly extending back member spaced rearwardly from the front member, upwardly extending near and far side plates normal to said members and widely spaced from each other and engaging and spacing said front and back members and welded thereto, a base plate upon which the lower ends of said members and said side plates are supported and to which they are welded, a top plate supported by and welded to the upper ends of said members and side plates, all said plates and members forming an internally unreinforced frame element, rectangular horizontal internal reinforcing structures having vertical peripheral edges closely fitting substantially the whole interior perimeters of said element adjacent the said edges of said structures and welded to said side plates and members throughout substantially the whole peripheries of said structures at spaced elevations in said element between the lower and upper ends thereof, said reinforcing structures with said base and top plates, side plates and members making a plurality of six-sided box-like fabrications comprising a whole reinforced frame element, bolts adjacent and aligned horizontally with certain of said structures and connected operatively to said front and back members, and means for stressing said bolts in tension and

prestressing said reinforcing structures in compression between said members.

4,116,040

TISSUE SIMULATING CALIBRATION AND REFERENCE STANDARD

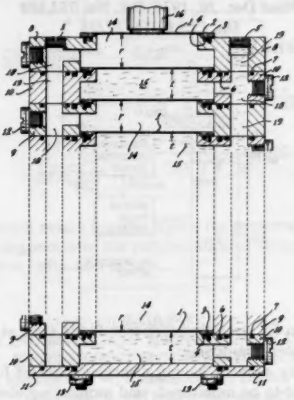
Günter Schoknecht, Mühlenstrasse 5, 1000 Berlin 37, and Udo Flesch, Fontanestrasse 7, 1000 Berlin 33, both of Fed. Rep. of Germany

Filed Nov. 16, 1977, Ser. No. 852,092

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1976, 2653384

Int. Cl.[2] G01C *25/00*

U.S. Cl. 73—1 R 4 Claims



1. Calibration dummy for simulating cell tissue, comprising: a stack of containers, separated from each other by thin foils and defining a path for transmission of ultrasonic waves, the containers being alternately filled with two different liquids, differing in their ultrasonic impedance, but both having acoustic speed, absorption and acoustic impedance values similar to the respective values for different human or animal cell tissue.

4,116,041

APPARATUS FOR BEARING CAPACITY MEASUREMENT WITH A FALLING WEIGHT DEFLECTOMETER

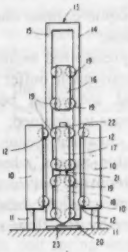
Bengt Olov Tholén, and Hans Ivar Hedström, both of Järfälla, Sweden, assignors to Kuab Konsult och Utveckling AB, Järfälla, Sweden

Filed Aug. 16, 1977, Ser. No. 825,077

Claims priority, application Sweden, Aug. 18, 1976, 7609211

Int. Cl.[2] G01N *3/30*

U.S. Cl. 73—12 7 Claims



1. An apparatus for bearing capacity measurement with a falling weight deflectometer comprising a frame structure for guiding a vertically movable intermediate weight of a predetermined mass and adapted to be supported by a pressure plate adapted to rest on the material to be measured such as the ground, a road, completed or in construction stage, a first shock absorber being interposed between the intermediate weight and the pressure plate, a falling weight being movable vertically along guides of the frame structure under the influence of gravity from a predetermined height to strike the intermediate weight through the medium of a second shock absorber, characterized in that one of the two shock absorbers is comprised of a body of elastically yieldable material such as shock absorbing rubber.

4,116,042

METHOD AND APPARATUS FOR DETECTING A CONSTITUENT IN AN ATMOSPHERE

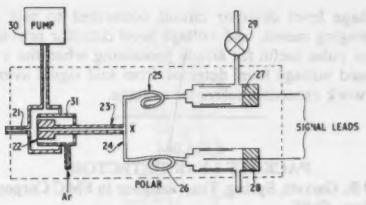
Anthony Jenkins, 54 Finchams Close, Linton, Cambridgeshire, and Douglas Walter Isgrove, 144 Malvern Rd., Cherryhinton, Cambridgeshire, both of England

Filed Nov. 18, 1976, Ser. No. 742,907

Claims priority, application United Kingdom, Nov. 20, 1975, 47727/75

Int. Cl.[2] G01N *31/06, 33/22*

U.S. Cl. 73—23 5 Claims



1. A method of detecting the presence of a particular constituent in an atmosphere which comprises drawing a sample of the atmosphere along two substantially identical flow paths, each path containing a respective detector capable of detecting said particular constituent, delaying the elution time of the particular constituent along one but not the other of the paths and passing the flows to the respective detectors, obtaining a resulting difference in signals from the two detectors, recognizing the presence of said particular constituent in the atmosphere when said difference signal has a positive increasing initial portion and utilizing said positive increasing difference signal to actuate means normally isolating the detector associated with said other flow path from an indicating means whereby to present a signal at said indicating means indicative of the presence of the particular constituent in the atmosphere.

4,116,043

ELECTRONIC DETECTION APPARATUS FOR LEAKS

John George Pencak, Fairport, N.Y., assignor to American Can Company, Greenwich, Conn.

Filed Jul. 11, 1977, Ser. No. 814,734

Int. Cl.[2] G01M *3/24*

U.S. Cl. 73—40 4 Claims

1. An electronic detecting apparatus for sensing the ultrasonic noise produced by a fluid flowing under pressure through a leak in an article comprising

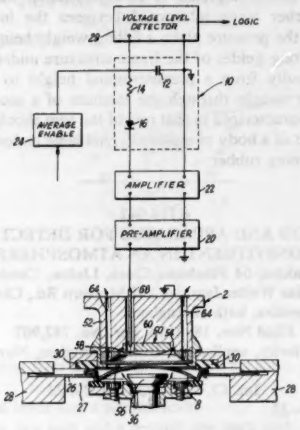
a microphone positioned near said article,

an amplifier means connected to said microphone so as to receive and amplify the electronic signal generated by said microphone,

a signal averaging means connected to the output terminals of said amplifier means to receive and average the signal generated by said amplifier device,

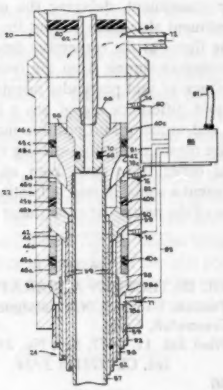
an enable circuit connected to said signal averaging means to provide an enable trigger pulse to said signal averaging

means when said pressure is applied to said fluid to thereby start the operation of said signal averaging network,



a voltage level detector circuit connected to said signal averaging means, said voltage level detector providing a logic pulse useful for article processing when the voltage to said voltage level detector from said signal averaging network exceeds a reference voltage.

4,116,044
PACKOFF LEAK DETECTOR
Michael R. Garrett, Spring, Tex., assignor to FMC Corporation, San Jose, Calif.
Filed Apr. 28, 1977, Ser. No. 792,083
Int. Cl.[2] G01M *3/28*
U.S. Cl. 73—40.5 R **9 Claims**



1. Apparatus for detecting a leak in an annular seal disposed between the exterior of an inner tubular member and a wellhead from which the inner tubular member is suspended, said apparatus comprising:

means for isolating the bore of said inner tubular member from the space directly above said annular seal;

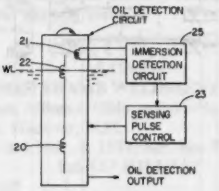
means for applying pressure to the top of said annular seal to provide a pressure differential across said annular seal;

first and second pressure-sensitive transducers;

means for connecting said first pressure-sensitive transducer to a chamber below said annular seal to detect changes in pressure below said seal in response to leakage therethrough due to the pressure differential across said seal; and

means for connecting said second pressure-sensitive transducer in said space above said annular seal to monitor the pressure applied above said annular seal.

4,116,045
OIL DETECTOR
Bronson M. Potter, R.F.D. 1, Greenville, N.H. 03048
Filed Dec. 20, 1976, Ser. No. 752,199
Int. Cl.[2] G01N *27/18*
U.S. Cl. 73—61.1 R **26 Claims**



1. A system for detecting different fluids such as oil at the surface of water comprising:

a monitoring element having a surface exposed for contact with fluid to be monitored, said monitoring element having an electrical current flow characteristic that changes as a function of temperature, and electronic circuitry for heating said monitoring element, said electronic circuitry adapted to apply heating current pulses to heat and produce a temporary increase in temperature of said monitoring element and said electrical circuitry including output means responsive to change in said electrical current flow characteristic during cooling of said monitoring element after termination of said heating to indicate the fluid in contact with said exposed surface.

4,116,046
LIQUID CHROMATOGRAPHY SYSTEM
Stanley Stein, Bloomfield, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.
Filed Aug. 5, 1977, Ser. No. 822,114
Int. Cl.[2] G01N *31/08*
U.S. Cl. 73—61.1 C **5 Claims**

1. A fully automated liquid-column chromatography system comprising in combination:

A. a plurality of gas pressurized buffer reservoir means;

B. an automatic, programmable buffer selection valve means whereby controlled sequential buffer flow from said buffer reservoir means is obtained;

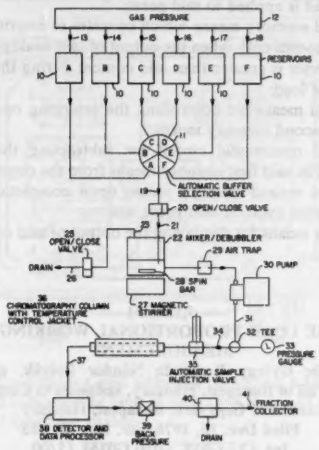
C. mixer-debubbler, chamber means downstream of said buffer selection value means whereby a concentration gradient may be established between said buffers and said buffer stream is concomitantly debubbled;

D. pump means whereby the flow rate of said buffers is controlled;

E. automatic sample valve means downstream of said pump means whereby samples are injected into said buffer stream in a sequential manner;

F. liquid chromatography column means whereby compo-

nents in said samples are separated and passed into a column effluent stream;



G. detection means for identifying the presence of said sample components in the column effluent stream; and

H. fraction collection means.

4,116,047

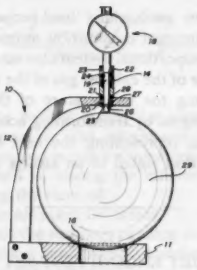
BOWLING BALL AND HARDNESS MEASURING INSTRUMENT HOLDING DEVICE

Charles S. Hejkal, 617 W. Commerce St., Dallas, Tex. 75208

Filed Sep. 6, 1977, Ser. No. 830,677

Int. Cl.[2] G01N *3/42*

U.S. Cl. 73—81 **2 Claims**



1. In a bowling ball and hardness measuring instrument holding device, a platform base member having a vertical bore through and a chamfer at an upper end intersection of the bore with a platform base member top surface forming a bowling ball retaining means; an upright member affixed at an end of the platform base member and having a free end section with a through bore vertically concentric with the platform base member vertical bore, the free end section above and spaced from the platform base member a distance greater than a diameter of a bowling ball; a straight tubular sleeve having a greater outside diameter portion and a lesser outside diameter portion, the greater diameter portion projected perpendicularly above the upright member free end section and the lesser diameter portion tightly fitted into the free end section through bore; a coil spring return means within an inner cylindrical chamber of the tubular sleeve, the coil spring and tubular sleeve having suitable inside diameters concentric with the free end section vertical bore to facilitate guided axial passage of a shaft sleeve of a hardness measuring instrument to the extent where an upper end of the coil spring engages an annular shoulder of the shaft sleeve causing resilient compression of the coil spring with axial movement of the shaft sleeve by a manual downward force on the hardness measuring instrument, the force moving a hardness measuring instrument shaft sleeve probe end to contact a surface of a bowling ball in the bowling ball retaining means; the hardness measuring instrument shaft sleeve probe end retracted into the tubular sleeve by resiliency of the coil spring with the downward force removed from the hardness measuring instrument.

4,116,048

HARDNESS TESTER

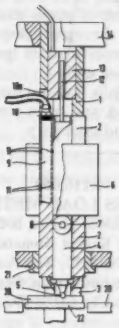
David Dale Appleford, and Paul Stephen Warwick, both of Swindon, England, assignors to Monsanto Company, St. Louis, Mo.

Filed Mar. 16, 1977, Ser. No. 778,102

Claims priority, application United Kingdom, Mar. 16, 1976, 10460/76

Int. Cl.[2] G01N *3/44*

U.S. Cl. 73—83 **2 Claims**



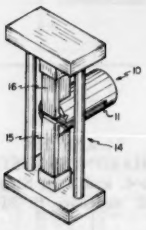
1. Apparatus for measuring the hardness of a sample of rubber, comprising a sample support surface, an indentor comprising a plunger terminating in a probe and having its axis perpendicular to the support surface, a housing within which the plunger is a sliding fit, means for introducing gas under pressure between the bearing surfaces of the plunger and the housing, a foot providing a datum surface that is flat and normal to the indentor axis, the foot being such as to allow free passage of the probe therethrough, means for lowering the foot into contact with a sample, means for lowering the probe into contact with the same such that the indentor is free standing on the sample and exerts on the sample a determined contact force for a first determined period of time, means applicable to the indentor to increase the weight on the sample by the indenting force increment for a second determined period of time, and means to indicate the downward movement of the indentor during the said second determined period of time; said apparatus further including a transducer which provides electrical signals indicative of the position of the indentor relative to the housing, and an electrical circuit including a linear analogue to digital convertor which obtains and stores a digital number corresponding to the position of the indentor in contact with the sample at the end of the first said period of time, and a non-linear analogue to digital convertor which includes a digital store in the form of a "table" giving the non-linear correlation defined in the Standards between indentation (converted to an analogue input signal) and International Rubber Hardness Degrees presented as a digital output.

4,116,049

METHOD FOR MEASURING PLANE STRAIN FRACTURE TOUGHNESS

Lynn Marshall Barker, Salt Lake City, Utah, assignor to Terra Tek, Inc., Salt Lake City, Utah

Filed Jun. 10, 1977, Ser. No. 805,312
Int. Cl.[2] G01N *3/08*
U.S. Cl. 73—87 **4 Claims**



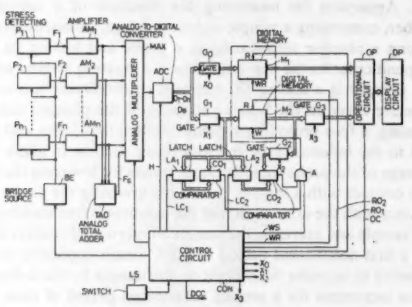
1. A method for measuring the fracture toughness of a material comprising the steps of,
- forming a slotted specimen leaving an internal "*v*" shape as a remainder therein;
- applying an incrementally increasing load to cause a crack to initiate and propagate in plane strain conditions along a predetermined path through said specimen;
- measuring the maximum load in propagating the crack through the specimen; and
- calculating said material's fracture toughness from the measured maximum load, and from considerations involving the specimen size and geometry.

4,116,050

PRESS LOAD METER

Sakae Tanahashi, and Takashi Shima, both of Hiratsuka, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Japan

Filed Sep. 28, 1977, Ser. No. 837,589
Claims priority, application Japan, Sep. 30, 1976, 51-117717
Int. Cl.[2] G01B *7/16*
U.S. Cl. 73—88.5 R **6 Claims**



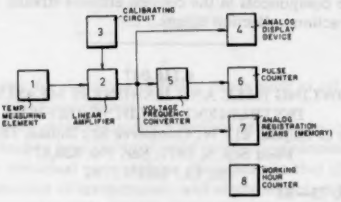
1. A press load meter comprising:
- a plurality of stress detecting sections provided at predetermined points of the ram or slide of a press and built in a bridge circuit;
- adder means for summing the outputs of said stress detecting sections in an analog mode;
- an analog multiplexer for repeatedly scanning the outputs of said adder means and stress detecting sections to arrange said outputs in time-sharing series;
- an analog-to-digital converter for converting the output of said analog multiplexer to digital signals;
- a first memory means for storing the outputs of said analog-to-digital converter which are representative of initial unbalance components of said stress detecting sections prior to start of one operation cycle of the press, i.e., when no load is applied to said press;
- a second memory means which operates to rewrite its storage content only when the output of said analog-to-digital converter is greater than said content during the application of load;
- a control means for controlling the rewriting operation of said second memory means;
- a digital operational circuit for subtracting the content stored in said first memory means from the content stored in said second memory means upon completion of one operation cycle of said press; and
- a display means for displaying the output of said operational circuit.

4,116,051

ENGINE LOAD-PROPORTIONAL WORKING TIME MEASUREMENT

Lajos Laíb; György Komándi; Nándor Polyák, and János Bolyky, all of Budapest, Hungary, assignors to Csepel Muvek Hiradastechnikai Gepgyara, Budapest, Hungary

Filed Dec. 16, 1976, Ser. No. 751,055
Int. Cl.[2] G01K *3/04*; G01M *15/00*
U.S. Cl. 73—116 **2 Claims**



1. A method for establishing load-proportional working characteristics of internal combustion motors comprising establishing a load-proportional system characteristic by measuring the temperature of the exhaust gas of the motor, producing a signal representing the temperature of the exhaust gases, generating a load signal by transforming according to a linear function the signal representing the said temperature, and coupling the said load signal to an analog or digital display means.

4,116,052

JET ENGINE TEST SET

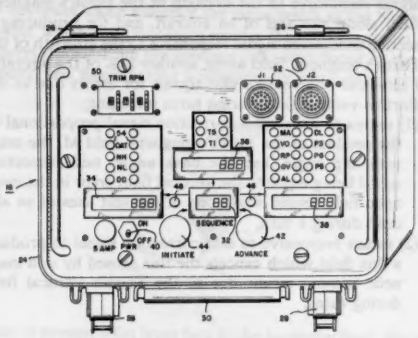
Charles F. Paluka, Northridge, Calif., assignor to Semco Instrument, Inc., North Hollywood, Calif.

Filed Sep. 19, 1977, Ser. No. 834,277
Int. Cl.[2] G01M *15/00*
U.S. Cl. 73—117.3 **28 Claims**

20. An apparatus for the multifunctional testing of an engine, comprising:
- means for connecting the test apparatus to the engine;
- variable means for displaying a sequence number representing the successive tests undertaken by the testing apparatus;
- advance switch means for manually advancing the test sequence to the desired test sequence;
- initiate switch means for initiating the test sequence indicated by the sequence display means;
- a plurality of additional variable display means for displaying data resulting from tests performed by said test apparatus;
- means for successively testing various engine parameters and displaying in the sequence display means an indication of the tests being performed and for presenting the data

results from said tests in said additional variable display means;

means for establishing limits for a number of said tests; and



means for stopping said tests and providing a special bold visual indication of fault at such time as any of said established limits are passed.

4,116,053

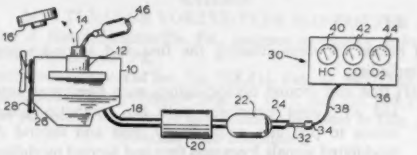
THERMAL REACTOR/CATALYTIC CONVERTER EFFICIENCY DETERMINATION METHOD

John David Blanke, Fullerton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Aug. 15, 1977, Ser. No. 824,897

Int. Cl.[2] G01M *15/00*

U.S. Cl. 73—117.3 **8 Claims**



1. In an engine having means for producing an air/fuel mixture including an air inlet, an exhaust system including a catalytic converter, and means for injecting air into the exhaust system, the method of testing the efficiency of the exhaust system comprising the steps of:

(a) disabling the air injection means;

(b) verifying that the engine is running properly at curb idle speed and taking any corrective action necessary before proceeding to the next step;

(c) adjusting the air/fuel mixture producing means as necessary to achieve an oxygen level in the emissions from the exhaust system of 1% ±0.2%;

(d) enabling the air injection means;

(e) reading the oxygen level in the emissions from the exhaust system;

(f) disabling the air injection means;

(g) injecting a continuous flow of additional fuel into the air inlet in an amount sufficient to cause the carbon monoxide level in the emissions from the exhaust system to achieve a level of 2% ±0.1%;

(h) enabling the air injection means;

(i) reading the carbon monoxide level in the emissions from the exhaust system while maintaining the flow of additional fuel; and,

(j) determining the efficiency of the exhaust system as a function of the carbon monoxide level read in step (i) of this claim from a straight line graphic representation of efficiency in percent v. carbon monoxide in the exhaust emissions in percent passing through the points (100% efficiency, 0% carbon monoxide) and (0% efficiency, ((21-O_2%)/10)% carbon monoxide) where O_2% is the reading obtained in step (e) of this claim.

4,116,054

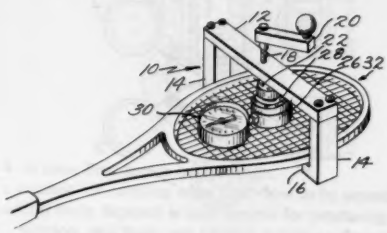
APPARATUS FOR MEASURING THE COMBINED RESISTANCE TO DISPLACEMENT OF STRINGS AFFIXED IN A RACKET HEAD

John G. Howe, Jamestown Star Rte., Boulder, Colo. 80302

Filed Apr. 25, 1977, Ser. No. 790,611

Int. Cl.[2] G01L *5/04*

U.S. Cl. 73—145 **7 Claims**



1. Apparatus for measuring the combined resistance to displacement of strings normally affixed in a plane within a racket head, said apparatus comprising:

an inverted U-shaped frame formed by a web portion and arms extending from opposite ends of the web, said arms being provided with respective flanges extending towards one another which are adapted to support the racket head at spaced locations about the head;

a member supported by the frame and movable in a direction normal to the plane of the strings when said racket head is supported by the flanges;

means for moving said member relative to the frame in said direction; and

a measuring device adapted to be interposed between the movable member and said strings in contacting relationship therewith whereby movement of the member towards said strings is transmitted by the measuring device to cause displacement of the strings from said normal plane, the measuring device including means for providing an indication of the force involved in effecting said displacement.

4,116,055

TIRE INSPECTING APPARATUS

Horst Kogler, Dieburg; Herwig Hönlinger, Gross-Rohrheim; Günther Himmler, Darmstadt, and Günter Knoll, Buttelborn, all of Germany, assignors to Gebr. Hofmann, G.m.b.H. & Co., Maschinenfabrik, Darmstadt, Germany

Filed Oct. 31, 1977, Ser. No. 847,027

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1976, 2653700

Int. Cl.[2] G01M *17/02*

U.S. Cl. 73—146 **7 Claims**

1. Apparatus for the automatic inspection of tires in an inspection area comprising:

means for moving a tire through said inspection area;

a plurality of pans each attached to said moving means for holding a tire;

particulate material partially filling said pans for the stabilization of the position of said tires in said pans;

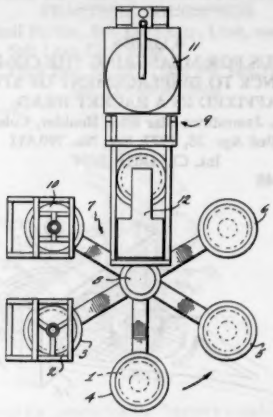
a base plate in said inspection area;

a means for covering said tire when said tire is in said inspection area including a covering hood having a top;

a mirror attached to said covering means;

means for lifting said mirror and said covering hood to

permit entry of said tire into and removal of said tire from said inspection area; and



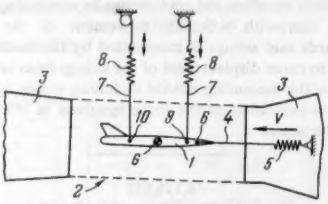
means for centering said mirror and said covering hood with respect to said base plate.

4,116,056

DEVICE FOR SUSPENSION OF AIRCRAFT MODEL IN WIND TUNNEL

Gennady Alexeevich Bulychev, ulitsa Dugina, 27, kv. 73; Anatoly Vladimirovich Bykovsky, ulitsa Gagarina, 26, kv. 70; Stanislav Pavlovich Machigin, ulitsa Naberezhnaya Tsiolkovskogo, 20, kv. 53, and Konstantin Sergeevich Strelkov, ulitsa Pushkina, 12, kv. 1, all of Zhukovsky Moskovskoi oblasti, U.S.S.R.

Filed Jul. 12, 1977, Ser. No. 814,973
Int. Cl.[2] G01M 9/00
U.S. Cl. 73—147 **12 Claims**



1. A device for suspension of an aircraft model in a wind tunnel, comprising two horizontal ropes extending on both sides of said model and connected to said model ahead and behind its center of gravity, as well as to said wind tunnel; two vertical ropes connected with their ends to said model, while their opposite ends are connected to said wind tunnel.

4,116,057

PENDULOUS INDUCTION COMPASS TRANSMITTER WITH MEANS TO COMPENSATE FOR HEADING ERRORS IN TURNS DUE TO THE VERTICAL COMPONENT OF THE EARTH'S MAGNETIC FIELD AND DUE TO TWO CYCLE ERROR

Gerald Leslie Sullivan, 24 Scollay Cir., Salem, Rockingham, N.H. 03079

Filed Dec. 20, 1976, Ser. No. 752,265
Int. Cl.[2] G01C 21/00
U.S. Cl. 73—178 R **4 Claims**

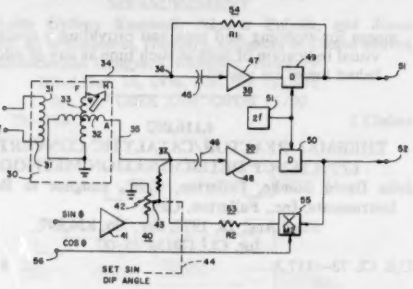
1. In a pendulous induction compass transmitter compensated for errors due to the Earth's field and for two cycle errors during turns, the combination comprising:

(a) magnetic sensing means for producing a first modulated signal responsive to the strength of the Earth's magnetic field along one axis of an aircraft, and for producing a second modulated signal responsive to the strength of the Earth's magnetic field along another axis of the aircraft,

(b) means to compensate said signals for errors due to the Earth's vertical field during turns including;

(1) means to generate a correction signal proportional to the product of the Earth's magnetic field M, the magnetic dip angle, and the bank angle, said correction signal being equal to the vertical field error in the magnetic field sensed along one of the said axes of an aircraft during a turn,

(2) means responsive to said correction signal to produce a flux field which cancels the flux sensed by said magnetic sensing means due to the Earth's vertical field during turns,



(c) means for demodulating the first and second signals including;

(1) first and second demodulators each having an input and an output associated with the magnetic sensing means to produce, respectively, first and second demodulated signals from said first and second modulated signals,

(2) feedback paths from the outputs to the inputs of each of said first and second demodulators for producing negative feedback signals,

(d) means to correct one of said first and second modulated signals for two cycle error including means to reduce the negative feedback in one of said paths by a factor proportional to the cosine of the bank angle whereby the output signal of the demodulator associated with said one feedback path is increased correspondingly to cancel two cycle error.

4,116,058

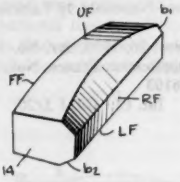
CONTOURED OBSTACLE ASSEMBLY FOR VORTEX-TYPE FLOWMETER

Peter J. Herzl, Morrisville, and Warren Strohmeier, Warminster, both of Pa., assignors to Fischer & Porter Co., Warminster, Pa.

Continuation-in-part of Ser. No. 758,849, Jan. 12, 1977, Pat. No. 4,052,895. This application Jul. 25, 1977, Ser. No. 818,733
The portion of the term of this patent subsequent to Oct. 11, 1994, has been disclaimed.
Int. Cl.[2] G01F 1/32
U.S. Cl. 73—194 VS **7 Claims**

1. A vortex-type flowmeter in which the fluid to be metered is conducted through a flow tube having a given internal diameter and an obstacle assembly therein to cause vortex shedding at a frequency which is a function of flow rate, said assembly comprising a block fixedly mounted across the tube at right angles to the direction of flow, said block having a

width as measured between the upper and lower faces of the block which assumes a maximum value at its midpoint and diminishes gradually toward the ends where the width assumes a minimum value whereby the mean width of the block has a value which is significantly smaller than the maximum value, thereby minimizing the pressure drop introduced by the flowmeter, said block having a substantially rectangular cross-sec-



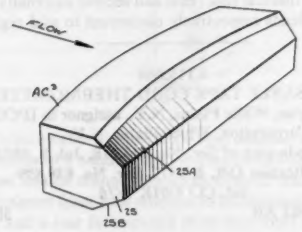
tion to present a flat front face to the incoming fluid, the upper and lower faces being bellied and the front face having a double-convex contour to produce a block contour which is compatible with a typical flow velocity profile, the upper and lower rear corners of the block being bevelled to define a flat rear face of reduced width to enhance the shedding characteristics of the assembly.

4,116,059

MULTI-RANGE VORTEX-TYPE FLOWMETER

Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Continuation-in-part of Ser. No. 768,416, Feb. 14, 1977, Pat. No. 4,062,238. This application Sep. 20, 1977, Ser. No. 835,170
The portion of the term of this patent subsequent to Dec. 13, 1994, has been disclaimed.
Int. Cl.² G01F *1/32*
U.S. Cl. 73—194 VS **6 Claims**



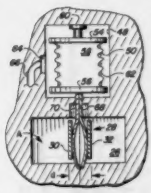
1. In combination with a flowmeter of the vortex type in which an obstacle assembly mounted in a flow tube includes a block having a predetermined configuration fixedly mounted across the tube at right angles to the direction of fluid flow, the front face of the block being presented to the incoming fluid, a replaceable adapter cap fitting over the front face of the block, said cap having a longitudinal channel therein which conforms to the profile of the block and acts as a socket therefor, said cap having a formation effectively expanding the cross-sectional area of the block throughout the length of the block without altering its geometric configuration whereby the resultant expanded block restricts the effective area in the flow tube of the fluid passing by the block, thereby making it possible to measure flow rates below the normal operating range of the meter in the absence of the cap.

4,116,060

MASS FLOW SENSOR AND METHOD

Gary L. Frederick, Tempe, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 747,119, Dec. 2, 1976, abandoned. This application Dec. 14, 1977, Ser. No. 860,549
Int. Cl.² G01F *1/32*
U.S. Cl. 73—194 VS **36 Claims**



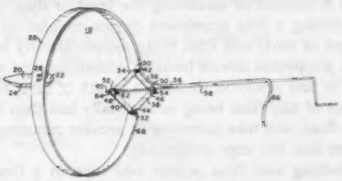
1. A mass flow sensor comprising:
a conduit for carrying mass fluid flow to be sensed;
a bluff body disposed in said conduit for producing periodic vortices, said body and conduit defining a flow cross-sectional area A therebetween, said body having a characteristic dimension *d* in a direction substantially perpendicular to the direction of mass flow through the conduit whereby the frequency of said vortices is a function of the product $A \times d$;
means for adjusting the product $A \times d$ in relation to the density of said mass flow whereby said frequency is indicative of said mass flow; and
means for sensing said frequency.

4,116,061

SEWER LINE ANALYZER PROBE

Peter D. Petroff, 4102 Piedmont Dr., Huntsville, Ala. 35802

Continuation of Ser. No. 602,974, Aug. 8, 1975. This application Jun. 30, 1977, Ser. No. 811,557
Int. Cl.² G01F *23/14*
U.S. Cl. 73—299 **1 Claim**

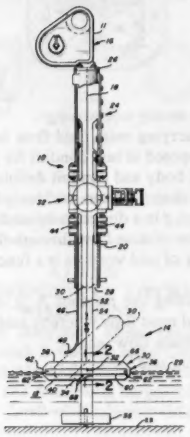


1. A device for measuring liquid height in a pipe comprising:
a generally circular loop, said loop being discontinuous at a pair of spaced ends;
a pressure transducer mounted on said loop; and
adjustable connecting means interconnecting said ends and including operating means for adjustably varying the distance between said ends, whereby the effective circumference of said loop is variable, wherein said adjustable connecting means includes operating means comprising an arm of a length in the range of 0.8 to 5 times the diameter of said loop for positioning said loop within a said pipe and selectively operating said operating means, whereby: said loop would be contracted to enable it to be inserted into a pipe; would then be expanded to enable it to engage and lock into peripheral engagement with the pipe; and finally, being removable by contraction of said loop.

4,116,062
REMOVABLE TANK GAUGE FLOAT

Raymond G. Reip, Clarendon Hills, Ill., assignor to Vapor Corporation, Chicago, Ill.

Filed Aug. 4, 1977, Ser. No. 821,791
Int. Cl.[2] G01F *23/08*
U.S. Cl. 73—321 8 Claims



1. A method of measuring the level of fluid in a reservoir employing a data acquisition device coupled to a float by a length of wire, said float being asymmetrically mounted, said data acquisition device being in communication with the interior of said reservoir through a length of tube; the depth and width of said float being substantially less than the length of said float, said tube including an arcuate camming surface at a lower end, the steps comprising:

pivoting said float within said tube to a first orientation wherein the length of said float is parallel to the axis of said tube and the width of said float is transverse to said axis;

lowering said float in said tube to said lower end thereof;

pivoting said float to a second orientation by sliding engagement of said float along said camming surface due to said asymmetrical mounting as said float is lowered wherein said length of said float in said second orientation being substantially transverse to said axis; and

lowering said float to floating engagement with the upper surface of said fluid

measuring the distance said float was lowered to determine the level of said fluid,

raising said float from said fluid surface toward said lower end of said tube;

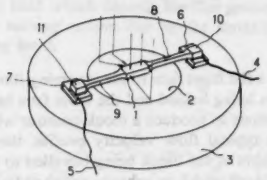
pivoting said float to said first orientation;

raising said float into said tube; and removing said float from said tube.

4,116,063
LIQUID HELIUM-COOLED BOLOMETER WHEREIN THE SENSITIVE ELEMENT AND THE ELEMENTS LINKING THE LATTER TO THE ELECTRICAL CONNECTIONS ARE OBTAINED FROM THE SAME SEMICONDUCTOR BODY

Jacques Leblanc, Palaiseau; Gérard Dambier, Elancourt; Noël Coron, Igny, and Jean-Pierre Moalic, Plaisir, all of France, assignors to Agence Nationale de Valorisation de la Recherche, France

Filed Nov. 26, 1976, Ser. No. 745,491
Claims priority, application France, Nov. 26, 1975, 75 36104; Nov. 26, 1975, 75 36103
Int. Cl.[2] G01J *5/20*
U.S. Cl. 73—355 R 10 Claims



1. An ultra-sensitive bolometer comprising : a Thermal sink ; means for cooling the said thermal sink at a temperature lower than 5° K.; a semi-conductor crystal body having a central portion which is liable to temperature variations as a function of radiation to which the bolometer is subjected , said semi-conductor crystal body further having first and second elongate extensions ; first and second electrically conductive layers on said first and second extensions, said layers extending from said central portion respectively to first and second regions in which the said temperature variations are negligibly small; and layers making direct ohmic contact with said central portion without any additional bonding material between said layers and said central portion, said elongate extensions having a cross-section which is gradually decreasing; from said central portion in the directions of said regions, said elongate extensions and said layers having a predetermined thermal resistance ; rigid means thermally and mechanically connecting the said regions to the thermal sink ; first and second externally extending electrical leads respectively connected to said regions.

4,116,064
DISPOSABLE TAPE CORD THERMOMETER

John F. McGlynn, White Plains, N.Y., assignor to IPCO Hospital Supply Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 594,218, Jul. 9, 1975. This application Oct. 3, 1977, Ser. No. 838,899
Int. Cl.[2] G01K *7/16*
U.S. Cl. 73—362 AR 38 Claims

1. An electronic sensing assembly comprising: a plurality of sensing probes mounted in a disposable and severable electrically conductive tape in spaced relationship to each other, a cartridge for housing a supply of said tape, a reader unit comprising means for housing said cartridge, means for electrically contacting a portion of said tape proximate the cartridge with powered electronic circuitry and indicating means, said tape being severable at said probe to expose the probe and permit used tape portions to be discarded and means permitting withdrawal of additional lengths of tape, whereby a fresh length of

tape and a fresh probe can be withdrawn for each use of said sensing probe after severing the former length which was subject to a prior use.

25. For use in an electronic sensing assembly, a disposable and severable electrically conductive tape, a plurality of sensing probes mounted in said tape in spaced relationship to each other, said tape being severable at said probe to expose the probe and permit used tape portions to be discarded and permitting use of additional lengths of tape, whereby a fresh length of tape and a fresh probe can be used after severing the former length which was subject to a prior use.

4,116,065

TRANSPARENT THERMOMETER

William Kenneth Jensen, Royal Oak, Mich., assignor to O.E.M. Technical Sales, Inc., Southfield, Mich.

Filed Aug. 29, 1977, Ser. No. 828,705
Int. Cl.² G01K *1/14*
U.S. Cl. 73—378 **3 Claims**

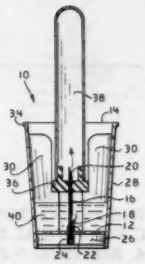
1. A thermometer device of the type adapted to be mounted on the outside of a window for viewing from within a compartment, said device comprising an elongated, transparent body having a planar front face adapted to be disposed adjacent said window and a rear face spaced from said front face, a pair of integral tab members projecting beyond the upper and lower ends of said body, a recess formed in the front face of said body and axially aligned between said tabs, an elongated, encapsulated tube containing a temperature responsive liquid therewithin, said tube being mounted within said recess so as to be disposed between the front and rear faces of said transparent body, said encapsulated tube including an enlarged, temperature responsive, liquid containing reservoir at its lower end, said body recess terminating at its lower end in an opening extending between the front and rear body faces and within which opening said reservoir is disposed, a temperature indicating scale disposed on said body proximate said recess, a pair of transparent brackets each including a first face adhered to said window and a second face transversely spaced from said first bracket face and means for securing said tabs to the second faces of said brackets whereby the entire transparent body is transversely spaced from said window.

4,116,066

SPECIMEN SAMPLER CUP

Jack J. Mehl, Landing, and Edward L. Nugent, North Caldwell, both of N.J., assignors to Becton, Dickinson and Company, Rutherford, N.J.

Filed Dec. 12, 1977, Ser. No. 859,591
Int. Cl.² A61B *10/00*
U.S. Cl. 73—421 R **15 Claims**



1. A liquid specimen collection apparatus for biological fluids comprising:

a collection container having a closed bottom end and an open top end; and

a hollow cannula substantially vertically attached to said container, the cannula having an upper end adapted for piercing a closure of an evacuated container, and an opening towards its bottom end in fluid communication with the interior of the collection container

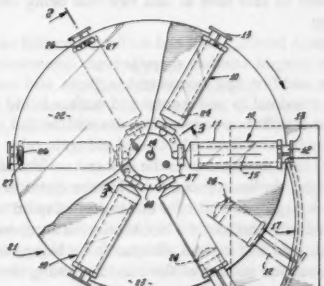
whereby a liquid deposited in the collection container will flow into the opening towards the bottom end of the cannula, through the cannula, and into the evacuated container when the upper end of the cannula penetrates the closure of the evacuated container.

4,116,067

FLUID SAMPLING DEVICES

David V. Pankratz, La Canada, and Bruce E. Wright, Rolling Hills Estates, both of Calif., assignors to Aerovironment Inc., Pasadena, Calif.

Filed Sep. 6, 1977, Ser. No. 830,384
Int. Cl.² G01N *1/24*
U.S. Cl. 73—421.5 R **10 Claims**



1. Fluid sampling apparatus comprising:

(a) a syringe having cylinder and plunger elements, there being a cam follower on one of said elements,

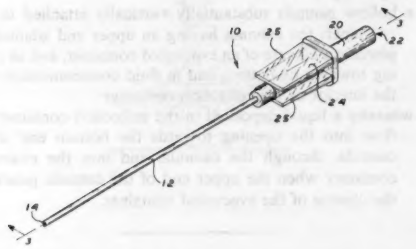
(b) the syringe having an opening to pass fluid between the cylinder exterior and interior,
(c) a cam having a riser engaging said follower, and
(d) means to effect relative motion between the syringe and cam to in turn cause the cam riser to displace the follower whereby the plunger and cylinder are relatively displaced for displacing fluid through said opening.

4,116,068

ADAPTER FOR THE ASPIRATION NOZZLE OF AN AUTOMATIC ANALYTICAL INSTRUMENT

Shenoda S. Megahed, Rutherford, N.J., assignor to Becton, Dickinson and Company, Rutherford, N.J.

Filed Mar. 18, 1977, Ser. No. 778,929
Int. Cl.[2] G01N *1/14;* B01L *3/02*
U.S. Cl. 73—425.4 P **2 Claims**



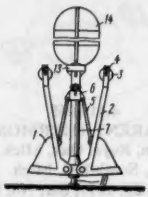
1. An adapter for transferring liquid specimens from a collection vessel to an analysis instrument, which comprises;
an elongate tube having a first end and a second end, said second end being expanded so that the bore of said tube has the configuration of a funnel with the funnel opening at said second end, the bore of said tube at said first end having a diameter of about 0.050 inches and the outer diameter of said tube at said first end being about 0.085 inches;
an endpiece having a first end surface, a second end surface and a straight conduit therethrough communicating between said first and second end surfaces, said conduit at a point proximal to said second end surface being expanded so that it will receive in sealing association and mate with the expanded second end of said elongate tube;
a flexible tube mounted over the first end surface and on said endpiece, the end of said flexible tube distal to said endpiece being open and of a dimension adapted to receive the aspiration nozzle of a biochemical analysis instrument;
said expanded end of said elongate tube being mounted in the expanded portion of the conduit passing through said endpiece, sealing the second end surface;
the bore of said elongate tube, conduit of said endpiece and bore of said flexible tube all being in communication with each other to form a continuous, closed, uninterrputed passage between the first end of said elongate tube and the distal end of said flexible tube, said passage being free of cavities which would retain and trap liquids passing therethrough; and
means for grasping said adapter, mounted on said endpiece.

4,116,069

DEVICE FOR TAKING BOTTOM SOIL SAMPLES FROM DEEP WATER BASINS

Georgy Mikhailovich Lezgintsev, Leninsky prospekt, 36, kv. 250; Stanislav Jurievich Istoshin, Koptevskaya ulitsa, 26, korpus 3, kv. 69; Mikhail Anatolievich Belyavsky, ulitsa Butlerova, 10, kv. 81; Evgeny Alexeevich Kontar, ulitsa Kropotkina, 9, kv. 2; Nikolai Nikolaevich Koptyazhin, Matveevskaya ulitsa, 36, korpus 2, kv. 145, all of Moscow; Georgy Ivanovich Agaltsov, ulitsa Yana-Shilfa Yaunzema, 5, kv. 3, Riga; Boris Serafimovich Chernov, ulitsa Zilupes, 22, kv. 97, Riga; Eduard Isaakovich Ter-Saakov, ulitsa Moskavas, 71, kv. 2, Riga, and Evgeny Petrovich Shkatov, ulitsa Ordinarnaya, 20, kv. 14, Leningrad, all of U.S.S.R.

Filed Jul. 16, 1976, Ser. No. 705,915
Int. Cl.[2] G01N *1/00;* E02F *3/44;* B66C *3/02*
U.S. Cl. 73—425.2 **3 Claims**



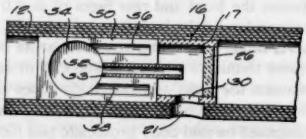
1. A device for taking bottom soil samples from deep water basin comprising: a frame, a leader rod accommodated in said frame and provided with a float at the top; a sampling element located at the lower part of said leader rod and made in the form of a grab with normally open jaws; ballast weights removably suspended from said frame and weighing enough to lower the device in the water of the basin until the lower end of said leader rod strikes the bottom of the basin; means for closing the grab jaws; means for removing the ballast weights from said frame when said leader rod strikes the bottom of the basin; wherein said means for removing includes a mechanical lock joint, which connects said weights with the leader rod so that when said leader rod strikes the bottom said lock joint shifts the weights to an unstable state and they are removed from the frame, containers which are articulated at lower points on the jaws of the grab in a state of labile equilibrium and are filled with the ballast weights of a preset mass, and a system of levers, said levers having one end connected with said leader rod and the other end bearing against said containers for holding them in an initial position and for releasing them at the moment when the leader rod strikes an obstacle, said leader rod being movable in an axial direction.

4,116,070

MOLTEN METAL SAMPLER WITH REFRACTORY MOLD HALVES

Richard A. Falk, 519 Westminster Dr., Waukesha, Wis. 53186

Filed Aug. 18, 1977, Ser. No. 825,800
Int. Cl.[2] G01N *1/12*
U.S. Cl. 73—425.4 R **3 Claims**



1. Molten metal sampling apparatus comprising a sleeve, a side entry port in said sleeve, and a sample cartridge including refractory wall means defining a cylindrical mixing chamber having an open end and an entry port in the side wall in regis-

try with said sleeve entry port to receive molten metal entering said side entry port, said sample cartridge including refractory mold halves having recesses, said mold halves cooperating to form a fill chamber and a sample forming cavity, with said fill passage being positioned in said sleeve in communication with said open end of said mixing chamber to receive metal therefrom.

4,116,071

DEVICE FOR MEASURING QUANTITY OF FLOWABLE MATERIALS

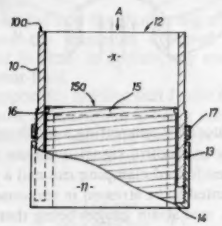
Gerald Paul Sakura, 1 Earl Cottages, London, SE1, England

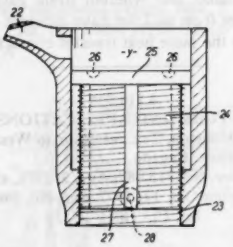
Filed Dec. 1, 1976, Ser. No. 746,202

Claims priority, application United Kingdom, Dec. 1, 1975, 49274/75

Int. Cl.[2] G01F *19/00*

U.S. Cl. 73—429 6 Claims





1. A measuring device having a in a container with an open top which enables charging and/or discharging of a material into said chamber, said container comprises a cylindrical tube-like body having a central axis, and a member forming a wall of said chamber extending transversely of the central axis of said tube-like body, said wall being progressively movable in the direction of said central axis relative to said tube-like body for varying the volume of said chamber, said tube-like body having a first annular surface and said wall having a second annular surface and said first and second surfaces each being smooth and defining the variable volume interior of said chamber, said tube-like body having a third annular surface having a diameter different from said first annular surface, said member having a fourth annular surface in sliding engagement with said third annular surface and being displaceable relative to said third annular surface for varying the position of said wall within said chamber, screw-threaded connecting means on the fourth surface of said member and the third surface of said tube-like body providing the sliding engagement thereof, said third annular surface being an internal surface, and said member comprises a cylindrical plug for said tube-like body and said fourth annular surface being an external surface on said plug.

4,116,072

METHOD AND APPARATUS FOR DETERMINING THE DENSITY OF DRY FIBERS

Robert W. Cogley, Jr., Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Aug. 5, 1977, Ser. No. 822,052

Int. Cl.[2] G01N *9/02*

U.S. Cl. 73—433 8 Claims

1. A method for determining the density of dry fibers mainly in the form of fiber bundles comprising the steps of:

(a) weighing a sample of said dry fibers,

(b) opening the fiber bundles of the sample to disperse said fiber bundles into a combination of smaller fiber bundles and individual fibers by the use of pressurized air,

(c) depositing the combination of smaller fiber bundles and individual fibers onto a screen,

(d) measuring the volume of said deposited combination, and

(e) calculating the density of the dry fibers using the measured weight and volume of the sample.

4,116,073

BALANCING SYSTEM

Sailor H. Mohler, 5410 Lightning View, Columbia, Md. 21044

Filed Dec. 14, 1977, Ser. No. 860,326

Int. Cl.[2] G01M *1/12*

U.S. Cl. 73—483 12 Claims

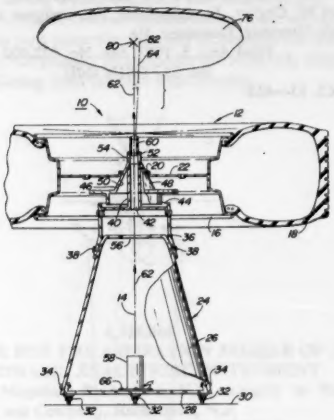
1. A balancing system for balancing an object about a vertically directed axis line, comprising:

(a) housing means adapted to be levelled on a base surface defining a plane substantially normal said vertical axis line;

(b) balancing head means displaceably mounted to said housing means, said object being releasably mounted to an external surface of said balancing head means; and,

(c) light emission means fixedly secured to said housing means and said balancing head means for passing at least a first coherent beam of light substantially coincident said vertical axis line in a predetermined direction and a second coherent beam of light angularly displaced from said first beam of light in said predetermined direction responsive to an unbalanced condition of said object about said verti-

cal axis line, said first and second beams of light being substantially coincident each with respect to the other



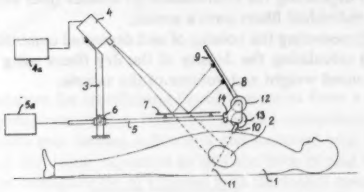
when said object is in a balanced condition with respect to said vertical axis line.

4,116,074

METHOD AND APPARATUS FOR THE EXAMINATION OF BODIES

Palle Rasmus Jensen, Forhabningsholms Alle 30; 1904, Copenhagen V, Denmark

Filed Sep. 10, 1976, Ser. No. 721,958
Claims priority, application Denmark, Sep. 12, 1975, 4079/75
Int. Cl.² G01N *29/00*
U.S. Cl. 73—607 **21 Claims**



1. A method for facilitating the examination of an object within an optically opaque body through the use of an impulse-echo technique that includes transmitting a sequence of energy impulses into a body along a line from a source, receiving echoes from an object located within the body along said line in response to each impulse, and displaying the received echoes as luminous points on a linear array, the spacing of each luminous point from one end of the array being proportional to the distance from said source of the corresponding echo-producing point on the object, wherein the improvement comprises:

locating a reflecting surface at a reference plane between an observation point and the body such that the reflecting surface faces the observation point and intersects a line between the observation point and the object in the body;

positioning the source at a predetermined location with respect to the reference plane;

operatively coupling the linear array to the source in a predetermined relation thereto for movement, relative to the reference plane, in synchronism with movement of the source, relative to said body; and

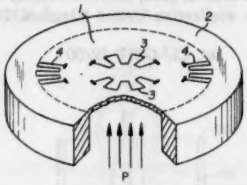
providing a reflective path from the linear array to the observation point via the reflective surface such that a virtual image of each luminous point of the array is provided by the reflective surface at an apparent location, relative to the observation point, that is coincident with the actual location of the corresponding echo-producing point on the object in the body.

4,116,075

MECHANICAL TO ELECTRICAL TRANSDUCER

Werner Ort, Darmstadt, Fed. Rep. of Germany, assignor to Hottinger Baldwin Messtechnik GmbH, Darmstadt, Fed. Rep. of Germany

Filed Feb. 9, 1977, Ser. No. 767,124
Claims priority, application Fed. Rep. of Germany, Mar. 1, 1976, 2608381
Int. Cl.² G01L *9/04*
U.S. Cl. 73—708 **18 Claims**



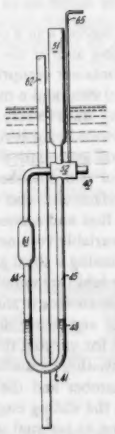
1. In a transducer for converting a mechanical movement of a diaphragm to an electric signal, wherein the diaphragm is mounted on a reinforced clamping rim and a plurality of strain gauges are mounted to be stressed in response to movement of said diaphragm, said strain gauges being thermally coupled to said rim and being mounted at different distances from said rim, the improvement wherein the heat transfer characteristics of said transducer between said rim and each of said strain gauges are the same, and wherein strain gauges located at different distances from said rim have different surface dimensions, to achieve the same heat transfer characteristics.

4,116,076

SENSITIVE J-TUBE AND APPLICATIONS THEREOF

David G. Nolte, Houston, Tex., assignor to Westinghouse Canada Ltd., Hamilton, Canada

Continuation of Ser. No. 713,087, Aug. 9, 1976, abandoned. This application Oct. 11, 1977, Ser. No. 840,932
Int. Cl.² G01F *23/16*
U.S. Cl. 73—299 **13 Claims**



1. Sensitive J-tube device for measuring change in the surface level of a fluid, comprising

a relatively small inside diameter U-tube containing a predetermined quantity of a colored indicator-fluid that is immiscible with said fluid the surface level of which is to be measured,

said indicator-fluid having a density approximately the same but heavier than said fluid being measured,

a relatively large inside diameter tube connected to one leg of said U-tube and forming the taller leg of said J-tube,

said large tube being long enough to extend from above the maximum surface level of said fluid being measured to below the minimum surface level thereof,

a three-way valve having three ports for connection to each of the legs of said U-tube and to the body of said fluid being measured,

means for connecting said U-tube leg ports to said U-tube at a location that is above the maximum height of said indicator-fluid therein,

said three-way valve having at least three positions one for connecting all three of said ports together and one for connecting only the shorter leg of said J-tube to the body of said fluid being measured and one for closing said U-tube leg ports,

a reservoir connected into the shorter leg of said J-tube at a location above the maximum expected height of said indicator-fluid in order to contain any overflow without loss of indicator-fluid,

an elongated support for holding said J-tube device in a fixed position when a measurement is being taken, and

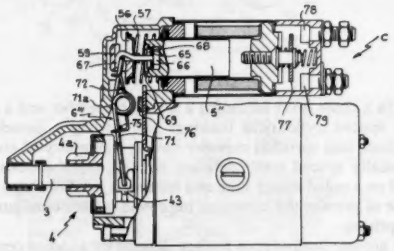
an elongated handle for actuating said three-way valve from a location above the surface of said fluid being measured.

4,116,077

STARTERS

Alfred Bruno Mazzorana, Venissieux, France, assignor to Societe de Paris et du Rhone, Lyons, France

Filed Nov. 1, 1976, Ser. No. 737,370
Claims priority, application France, Nov. 7, 1975, 75 34934
Int. Cl.[2] F02N *11/00, 15/06*
U.S. Cl. 74—7 A **6 Claims**



1. An improved electric starter of the type having a housing, a pinion reciprocable on a pinion shaft toward and away from an engaged position with the gear of an engine, a solenoid switch having an axially reciprocable core, and a lever operatively connected at its first end to reciprocate with the core and having a second end operatively connected to slide the pinion on the pinion shaft, the improvement comprising:

coupling means coupling the core to the first end of the lever in such a way that said first end of the lever is urged to reciprocate with the core;

connecting means connecting the second end of the lever to the pinion in such a way that the pinion will be moved axially with respect to the pinion shaft when the first end of the lever is reciprocated;

fixed opposed bearing surface means supported on the housing and located to bear against an intermediate portion of the lever to act as a fulcrum to cause pivoting of the lever, said intermediate portion of said lever rocking between engagement first with one of said fixed bearing surfaces and then subsequently into engagement with the other of said bearing surfaces as a result of movement of the solenoid core;

said lever comprising a hairpin-shaped steel wire member having a closed first end receiving said coupling means, and having arms extending away from said first end and comprising the second end of the lever engaging said connecting means, and the intermediate portion of the lever including a bent spring loop in each arm disposed between said bearing surfaces and operative to yieldably bias the pinion on the shaft in the direction in which the second end of the lever is urged by reciprocation of the core; and

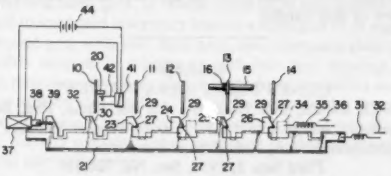
a plate attached to the lever intermediate its ends and operative to distort said spring loops and pre-tension them thereabout, said plate having first and second cut-outs through which the first and second ends of the lever respectively extend, and the plate having a central portion shaped to abut the spring loops and pre-tension the legs of the lever thereabout.

4,116,078

LOCK RELEASE MECHANISM FOR PUSH BUTTON LEVERS IN A TAPE RECORDER

Chiharu Kitamura, and Bunichi Ando, both of Tokyo, Japan, assignors to Trio Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 21, 1977, Ser. No. 808,541
Claims priority, application Japan, Jun. 23, 1976, 51-82454
Int. Cl.[2] G05G *1/02;* G11B *15/18;* E05B *47/00*
U.S. Cl. 74—10.27 **2 Claims**



1. A lock release mechanism for push button levers in a tape recorder comprising:

a stop button lever mounted on the tape recorder for angular movement and having a first and a second engaging portion;

a plurality of push button levers moveably mounted on the tape recorder;

a locking bar having a plurality of locking projections spaced along its length for locking engagement with said push button levers and having a release projection having a cam surface disposed for slidable engagement with said first engaging portion, said locking bar being urged lengthwise by a spring in a first direction, said locking bar being shiftable lengthwise in a second direction opposite to said first direction against the force from said spring toward a position wherein said locking projections are held back out of engagement with the push button levers when said first engaging portion of said stop button lever displaces upon its angular movement said release projection by slidable engagement with said cam surface;

a solenoid having a coil and an armature, said armature being mechanically connected to said locking bar; and

a switch electrically connected to said coil, said solenoid being energizable upon closing of said switch to thereby enable said armature to pull said locking bar in said second direction toward said position against the bias of said spring, and said switch being closable by said second engaging portion of said stop button lever upon its angular movement prior to displacement by said first engaging portion of said release projection.

4,116,079

CHAIN DRIVE SHIFT SYSTEM

James D. Pearce, 1800 Banbury Rd., Raleigh, N.C. 27608; Stanley E. Pearce, 5004 Lakemont Dr., Raleigh, N.C. 27609, and D. Kevin Pearce, 3025 Lewis Farm Rd., Raleigh, N.C. 27607

Filed Oct. 12, 1976, Ser. No. 731,852

Int. Cl.[2] F16H *9/00*

U.S. Cl. 74—217 B **5 Claims**

1. An improved shift means for standard bicycle sprocket derailleur means comprising: a plurality of varying sized sprocket means; a flexible chain drive means; standard derailleur means for shiftingly training said chain drive means from one sprocket to another; a generally J-shaped derailleur adapter means fixedly secured to said standard derailleur means; crank means pivotably mounted adjacent said derailleur means, one end of said crank means being in cooperative operative engagement with said J-shaped adapter means; and handle means operatively associated with said crank means on the end thereof opposite the engagement with said J-shaped adapter means whereby said derailleur can be moved to shift said chain drive means from one sprocket to another by manipulation of said handle.

4,116,080

CONE PULLEY ARRANGEMENT

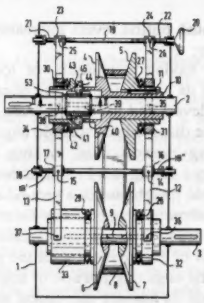
Heinrich Berens, Bad Homburg von der Hohe, Fed. Rep. of Germany, assignor to P.I.V. Antrieb Werner Reimers Kommanditgesellschaft, Fed. Rep. of Germany

Filed Sep. 3, 1976, Ser. No. 720,511

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1975, 2539094

Int. Cl.[2] F16H *55/52*

U.S. Cl. 74—230.17 A **43 Claims**



1. An infinitely variable cone pulley transmission arrangement which includes a drive input shaft, a drive output shaft, at least a pair of cone pulleys arranged on each shaft, a transmission means circulating between the pairs of pulleys on each shaft, means for connecting each pair of cone pulleys with one another and their associated shaft, means for mounting at least one cone pulley on each shaft for axial displacement relative thereto, a transmission ratio setting means for selectively axially displacing the axially displaceable cone pulleys, and rotary connection means provided at at least one of the pairs of cone pulleys for generating torque dependent and ratio dependent pressing forces between the cone pulleys and the transmission means including a presser device comprising a plurality of pairs of spaced oblique faces of variable gradients lying peripherally opposite one another, rolling means fashioned as ball elements interposed between each of the pairs of oblique faces, an axially mounted support ring arranged on the shaft, said rolling means being supported at least indirectly against an adjacent cone pulley and the support ring, the cone pulley associated with the pressing device is exclusively supported by the presser device, and the presser device is in shape-locking engagement with the ball elements of the rolling means, characterized in that the pairs of oblique faces form channels extending substantially parallel to the axis of the shaft, said channels having an effective oblique face gradient which is modified over the channel length, said ball elements of the rolling means being arranged in said channels so as to be displaceable substantially along the axis of the shaft over the entire transmission ratio, and in that an abutment face means is provided on at least one of the support ring and adjacent cone pulley facing the respective channels for engaging the ball elements of the rolling means.

4,116,081

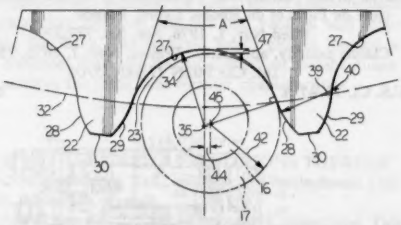
SPROCKET PROFILE

Richard W. Luttrell, Morton, and Robert J. Purcell, Washington, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed May 25, 1977, Ser. No. 800,387

Int. Cl.[2] F16H *55/30, 55/06*

U.S. Cl. 74—243 R **10 Claims**



1. In a chain drive including a sprocket member and a chain with spaced cylindrical bushings and having a preselected backlash, said sprocket member having a plurality of circumferentially spaced teeth defining pockets therebetween centered on a radial center line, said teeth being defined by a pitch circle of preselected radius, an improved pocket configuration comprising:

an arcuate bottom root surface defined by a radius centered on a point on said pocket center line spaced outwardly of said pitch circle, said radius being at least as great as the sum of the radius of said bushing plus one half of said backlash; and

an arcuate outer topping surface radially outward from each end of said root surface each topping surface extending to the periphery of the sprocket member.

4,116,082

COMPACT MANUAL TRANSMISSION FOR A TRANSVERSELY MOUNTED ENGINE

Donald William Kelbel, Muncie, Ind., assignor to Borg-Warner Corporation, Chicago, Ill.

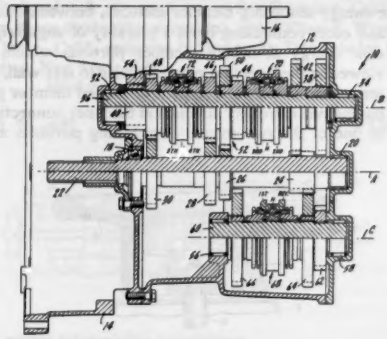
Filed Dec. 1, 1976, Ser. No. 746,460

Int. Cl.[2] F16H *3/08, 37/08, 3/02*

U.S. Cl. 74—360 **16 Claims**

1. A transmission comprising a rotatable input shaft, first and second gears secured to said input shaft for rotation therewith, a first countershaft, third and output gears secured to said first countershaft for rotation therewith, compound gear means

journalled on said first countershaft, said compound gear means including fourth and fifth gears secured together, said fourth gear meshing with said first gear, first clutch means movable for selectively engaging and disengaging said compound gear means with said first countershaft, a second countershaft, a sixth gear secured to said second countershaft for



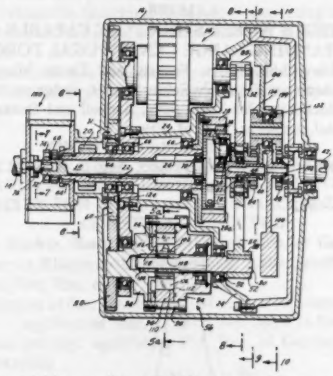
rotation therewith, said sixth gear meshing with said third gear, seventh and eighth gears journalled on said second countershaft, said seventh gear meshing with said fifth gear, said eighth gear meshing with said second gear, and second clutch means movable for selectively engaging and disengaging said seventh and eighth gears with said second countershaft.

4,116,083

VARIABLE SPEED TRANSMISSION

Laird B. Gogins, Salt Lake City, Utah, assignor to Power-Matic Corporation, Salt Lake City, Utah

Filed Dec. 17, 1976, Ser. No. 751,952
Int. Cl.[2] F16H *35/02*
U.S. Cl. 74—393 **16 Claims**



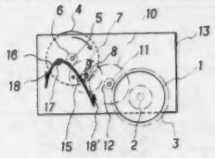
1. A variable speed transmission comprising, an input drive shaft, a variable throw crank assembly including an adjustably positioned crank pin having a zero throw position aligned with said input shaft, means for coupling said crank pin for rotation with said input shaft; means for varying the throw of the crank pin with respect to the shaft; a link member rotatably mounted on said crank pin; a plurality of selectively engaged clutches having input and output shafts, said clutch input shafts having cranks fixed thereto; a plurality of links respectively pivotally connected at their opposed ends to said clutch cranks and to said link member to oscillate said cranks upon movement of the link member by rotation of said crank pin with said input drive shaft; and means operatively connected to the output shafts of said clutches for rotation thereby.

4,116,084

MOVABLE TOY HAVING GEAR DISENGAGING MECHANISM AND GEAR CHANGING MECHANISM

Akio Masuda, Tokyo, Japan, assignor to Alps Shoji Co., Ltd., Tokyo, Japan

Filed Jun. 30, 1977, Ser. No. 811,861
Claims priority, application Japan, Dec. 27, 1976, 52-177106; Apr. 6, 1977, 52-43315
Int. Cl.[2] F16H *3/22, 1/02;* A63H *29/20*
U.S. Cl. 74—342 **7 Claims**



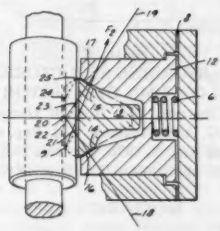
1. A movable toy having a gear disengaging mechanism which comprises: a first gear which is rotated by a driving section, a third gear which transmits the rotation to wheels, a second gear which is disposed between said first gear and said third gear, and a slot-shaped bearing hole for supporting the shaft of said second gear which is disposed on the outside of the imaginary line defined by connecting the shafts of said first gear and said third gear, in which the shaft of said second gear is urged toward said imaginary line by a spring so as to engage said second gear with said third gear, and when said third gear is forcibly stopped in relation to said first gear rotating in a certain direction, the shaft of said second gear is shifted in said bearing hole by the rotation of said first gear in the direction remote from said imaginary line against the force of said spring, thereby releasing the engagement between said second gear and said third gear.

4,116,085

RACK AND PINION STEERING GEAR

Arthur Ernest Bishop, 17 Burton St., Mosman, New South Wales, Australia

Filed Dec. 20, 1976, Ser. No. 752,802
Claims priority, application Australia, Dec. 31, 1975, PC4436
Int. Cl.[2] B62D *1/20;* F16H *1/18*
U.S. Cl. 74—422 **6 Claims**



1. A rack and pinion steering gear comprising a helical pinion engaging a rack mounted substantially transverse to the axis thereof, rack support means for guiding the rack for longitudinal reciprocation, spring means urging the pinion and rack into mutual engagement, a pair of longitudinal guide faces on the rack angularly inclined to the median longitudinal guide faces on the rack angularly inclined to the median longitudinal plane of the rack on each side, guide means in the rack support

means contacting the longitudinal guide faces of the rack, said guide faces being such that the common normals passing through the points of contact or passing through the centers of the areas of contact between the guide means and the guide faces intersect at a point displaced from the centroid of the rack section towards the pinion center-line.

4,116,086

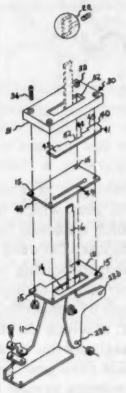
CHANGEABLE GATE PLATE MEANS FOR LEVER CONTROL DEVICES

William D. Langford, Stow; Dale F. Leuenberger, and Howard A. Hazlett, both of Cuyahoga Falls, all of Ohio, assignors to Incom International, Inc., Pittsburgh, Pa.

Filed Nov. 26, 1976, Ser. No. 745,293

Int. Cl.[2] B62D *1/04*; B60K *20/00*; G05G *1/04*

U.S. Cl. 74—532 **4 Claims**



1. A changeable gate plate means for lever control devices having a mounting plate with an opening therein through which the lever passes, said gate plate means comprising

a. a cover means adapted to mount on said mounting plate including an opening therein substantially coextensive with said opening in the mounting plate and a gate plate receiving means positioned adjacent said opening for removably positioning a gate plate at said opening and comprising a cavity formed integrally with the cover means having a peripheral cage adapted to abut said mounting plate; and

b. a gate plate removably positioned within said receiving means and including at least one opening in which said lever may travel and at least two stops for limiting travel of said lever.

4,116,087

ENERGY ABSORBING STRUCTURE FOR THE STEERING COLUMN OF A MOTOR VEHICLE

Gregor Zeller, Obernau, Fed. Rep. of Germany, assignor to Firma Petri AG, Aschaffenburg, Fed. Rep. of Germany

Filed Aug. 6, 1976, Ser. No. 712,357

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1975, 2535063

Int. Cl.[2] B62D *1/04*

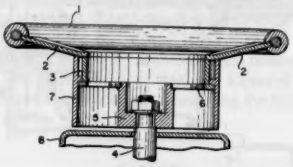
U.S. Cl. 74—552 **16 Claims**

1. An energy absorbing structure, particularly suited for use in a torque transmitting, rotationally rigid assembly, such as a steering wheel assembly, for example, which, when subjected to an axial force in excess of a predetermined level, undergoes plastic deformation, thereby absorbing energy from the source of said axial force, the structure comprising in combination:

an energy absorbing member having an outward shape which resembles that of an annular connecting member of uniform wall thickness, an inner connecting line and an outer connecting line being defined on opposite loop portions 16′ of the energy absorbing member; and

means defined by said torque transmitting assembly for connecting the energy absorbing member to two separate torque transmitting portions of the torque transmitting assembly at said inner and outer connecting lines, respectively; and wherein:

the energy absorbing member includes, between said inner and outer connecting lines, a plurality of angularly adjacent energy absorbing member portions which, when viewed in the direction perpendicular to said wall, have a serpentine shape, each serpentine-shaped member portion having one extremity attached at the inner connecting line to one of the two torque transmitting portions, and an-



other extremity attached at the other connecting line to the other torque transmitting portion; and

the serpentine-shaped member portions have loop portions which are so tight that substantially no deformation of the loop portions can take place under torque transmission by the energy absorbing member, said loop portions being subjected to and plastically yielding to torsion stress, when said axial force is applied to the energy absorbing member, via its inner and outer connecting lines, while the serpentine shape of the member portion is permanently stretched in the axial direction, undergoing plastic bending deformation, as the inner and outer connecting lines of the energy absorbing member shift in relation to one another in the axial direction.

4,116,088

COMPOSITE WHEEL STRUCTURE CAPABLE OF WITHSTANDING LARGE CENTRIFUGAL FORCES

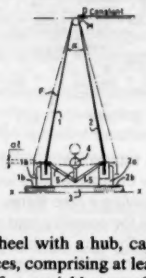
Jean-Luc Giovachini, Paris, France, and Dante Marc Vendramini, Asnieres, Hauts de Seine, France, assignors to Institute de Recherche des Transports, Arcueil and Dante Marc Vendramini, Asnieres, both of, France

Filed Aug. 4, 1976, Ser. No. 711,567

Claims priority, application France, Aug. 5, 1975, 75 24426

Int. Cl.[2] F16C *15/00*

U.S. Cl. 74—572 **12 Claims**



1. A composite wheel with a hub, capable of withstanding large centrifugal forces, comprising at least two elements made of materials with different yield strengths,

one of said elements being peripheral; the other of said elements connecting said peripheral element to said hub and being formed by two conical flanges having their concave sides facing each other and forming an angle therebetween; and means being provided to vary said

angle to obtain a limitation of the stresses in said flanges with the diameter of said wheel remaining constant and said angle widening.

4,116,089

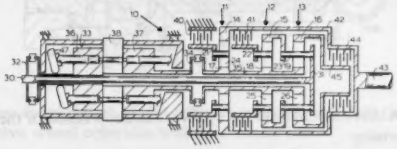
HYDROMECHANICAL TRANSMISSION

Elias Orshansky, Jr. deceased, late of San Francisco, Calif. (by Betty Bacon Orshansky, executrix), and William E. Weseloh, San Diego, Calif., assignors to Orshansky Transmission Corporation, New York, N.Y.

Filed Apr. 15, 1977, Ser. No. 787,851

Int. Cl.[2] F16H *47/04*

U.S. Cl. 74—687 **4 Claims**



1. A power transmission comprising:

a stationary frame,

input means,

output means,

first, second and third planetary assemblies each having a sun gear, a ring gear, and a carrier with planet gears, all said sun gears being rigidly connected together, the ring gear of said first planetary assembly being rigidly connected to said output means, the ring gear of said second planetary assembly being connected to the carrier of said third planetary assembly and therethrough to said input means,

a reversible speed-varying module connecting said input means to said first sun gear,

braking means for releasably connecting said carrier of said first planetary assembly to said frame, whereby when said braking means is engaged, said output means is driven from said input means through said speed-varying module and said first planetary assembly,

first releasable clutching means for connecting said carrier of said second planetary assembly with said output means, and

second releasable clutching means connecting said ring gear of said third planetary assembly to said output means.

4,116,090

CHANGE GEAR TRANSMISSION IN GROUP ARRANGEMENT, ESPECIALLY FOR MOTOR VEHICLES FOR USE IN AGRICULTURE AND IN THE CONSTRUCTION FIELD

Walter Zenker, Bensberg-Refrath, Fed. Rep. of Germany, assignor to Klöckner-Humboldt-Deutz Aktiengesellschaft, Cologne, Fed. Rep. of Germany

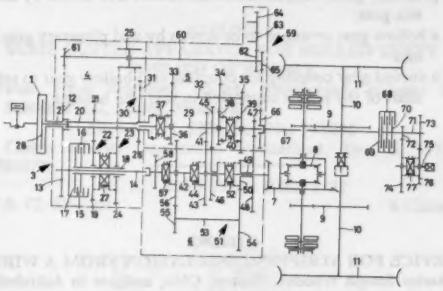
Continuation of Ser. No. 554,432, Mar. 3, 1975, abandoned. This application Mar. 4, 1977, Ser. No. 774,536

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1974, 2410163

Int. Cl.[2] F16H *3/02*

U.S. Cl. 74—745 **17 Claims**

1. A transmission in group arrangement with relatively small rotating masses and merely with friction clutch means suitable for frequent shifting under load, especially for motor driven agricultural and construction vehicles, comprising in combination: a main control group, a group transmission which precedes said main control group and having one control stage shiftable under load for rearward drive and having two control stages shiftable under load for forward drive adapted selectively to shift under load from forward drive to reverse drive by way of the same transmission as well as having a first input shaft adapted for continuous frictional connection to a source of driving power and a first output shaft, a main control transmission following said group transmission and having a first auxiliary shaft driven by the output shaft of said group transmission and a second output shaft, said control group having a third output shaft adapted for connection to a load, first gears fixed to said first auxiliary shaft, second gears rotatable on said second output shaft meshing with said first gears, first clutch means for selectively coupling said second gears to said second output shaft, third gears fixed to said second output shaft and fourth gears driven by said third gears and rotatable on said



third output shaft, second clutch means for selectively coupling said fourth gears to said second output shaft, a friction clutch means coaxially between said first input shaft and said first output shaft, a countershaft driven by said first input shaft, a hollow shaft coaxially rotatable on said countershaft, forward and reverse drive gear trains each including a gear fixed to said first output shaft and a gear rotatable on said hollow shaft, third clutch means for selectively coupling said hollow shaft to the said gears thereon, and interengageable clutch elements on said countershaft and hollow shaft.

4,116,091

DRIVE FOR AN ELECTRIC RAIL MOTOR CAR

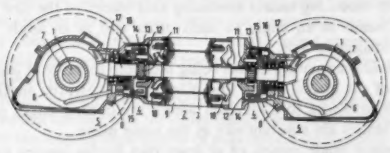
Roman Susdorf, and Heinz Engelmann, both of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Apr. 11, 1977, Ser. No. 786,566

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1976, 2616310

Int. Cl.[2] F16H *1/28;* B60K *1/00;* H02K *5/00*

U.S. Cl. 74—801 **5 Claims**



1. In a drive for use with an electric rail car having two axles, the drive comprising: a propulsion motor disposed between said axles and having a stator and a rotor, said stator being without housing and including a lamination stack arranged between pressure plates clamped by tensioning elements; angle transmissions responsive to said motor for coupling drive power to said axles, each of said transmissions including a pinion adapted to be connected to at least one of said axles and disposed at an end of the shaft of said rotor, and a transmission housing adapted to be supported by said one drive axle and supporting the lamination stack of said stator, said transmission housing including a bearing for supporting said end of said shaft; and a coupling for connecting the pinion of one of said transmissions to its respective end of said shaft,

said coupling being disposed between said respective shaft end and the bearing supporting said respective shaft end so as to permit longitudinal shifts and centering of said rotor shaft; the improvement comprising:

planetary drives, each disposed within one of said transmission housings between the pinion shaft of the of said one housing and the end of said rotor shaft supported in said one housing and including:

a sun gear formed by a geared portion of said end of said shaft supported in said one housing:

a stationary planet carrier;

planetary gears supported on said carrier and driven by said sun gear;

a hollow gear arranged to be driven by said planetary gears; and

a curved gear coupling for coupling said hollow gear to said shaft of the pinion supported in said one housing.

4,116,092

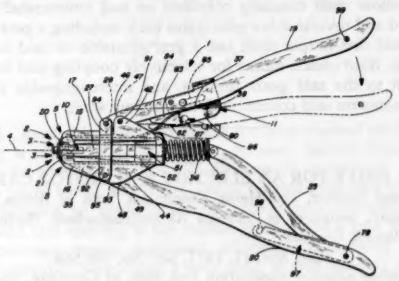
DEVICE FOR STRIPPING INSULATION FROM A WIRE

Charles Joseph Wheeler, Geneva, Ohio, assignor to Ashtabula Development Co., Ashtabula, Ohio

Filed Jun. 13, 1977, Ser. No. 805,699

Int. Cl.[2] H02G *1/12*

U.S. Cl. 81—9.5 R **13 Claims**



13. A device for stripping insulation from a wire, comprising,

first blade means of at least two blades having cutting edges,

first mounting means mounting said blades of the first blade means at an angle to each other and at an angle to an imaginary axis,

the first mounting means being movable to move at least one of the blades of the first blade means towards another of said blades to a location where the cutting edges of said blades are substantially in the same plane,

second blade means of at least two blades having cutting edges,

second mounting means mounting said blades of the second blade means at an angle to each other and at an angle to the blades of the first cutting means,

the second mounting means being movable to move at least one of the blades of the second blade means towards another of the blades of the second blade means to a location wherein the cutting edges of said blades of the second blade means are substantially in the same plane with the cutting edges of the blades of the first blade means, and then to move the second blade means axially of the imaginary axis away from the first blade means, and

motive means operably connected to the first and second mounting means to move said mounting means.

4,116,093

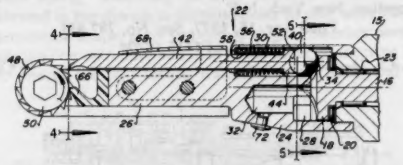
DRIVE MECHANISM FOR POWER RATCHET WRENCH

Glenn H. DePagter, Spring Lake, Mich., assignor to Gardner-Denver Company, Dallas, Tex.

Continuation of Ser. No. 743,997, Nov. 22, 1976, abandoned. This application Jan. 11, 1978, Ser. No. 868,658

Int. Cl.[2] B25B *13/46*

U.S. Cl. 81—57.39 **6 Claims**



1. A drive mechanism for a power ratchet wrench or the like comprising:

a rotatable spindle;

a housing including an interior chamber and means for supporting a toothed rotary ratchet socket;

a circular cam formed on said spindle and including at least one cam lobe projecting axially with respect to the axis of rotation of said spindle, said cam being disposed in said chamber;

a cylindrical bore in said housing and intersecting said chamber, the central axis of said bore being spaced from and substantially parallel to the axis of rotation of said spindle;

a spherical cam follower disposed in said bore for reciprocating movement in response to the rotation of said cam by said spindle;

an actuating member supported by said housing, said actuating member having an end portion adapted to be engaged by said cam follower and an opposite end portion engageable with said toothed socket for intermittent rotation of said socket in response to the rotation of said cam; and,

resilient means disposed in said bore and engaged with said actuating member for biasing said actuating member and said cam follower into engagement with said cam.

4,116,094

METHOD AND APPARATUS FOR CENTERING A WHEEL SET

Theodor Dombrowski, and Helmut Wittkopp, both of Erkelenz, Fed. Rep. of Germany, assignors to Wilhelm Hegenscheidt Gesellschaft mbH, Erkelenz, Fed. Rep. of Germany

Filed May 10, 1977, Ser. No. 795,428

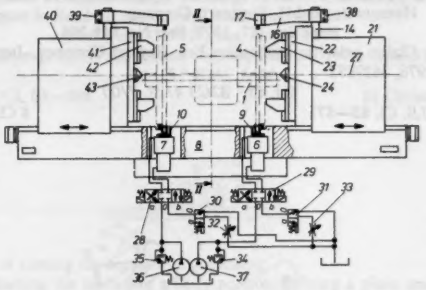
Claims priority, application Fed. Rep. of Germany, May 12, 1976, 2621050

Int. Cl.[2] B23B *5/28, 13/00*

U.S. Cl. 82—8 **11 Claims**

1. In an arrangement for centering a two-wheel set along a horizontal center line of a machine, a combination comprising a pair of vertically movable lifting means respectively engaging the wheels of the two-wheel set at bottom portions thereof; a pair of vertically movable sensing means respectively coordinated with said pair of lifting means and respectively arranged for engaging the wheels of the set substantially opposite said portions which are engaged by said lifting means; and means

cooperating with at least one of the first-mentioned two means for stopping the lifting movement of the respective lifting



means, independent of the other, when the center of the respective wheel coincides with said center line.

4,116,095

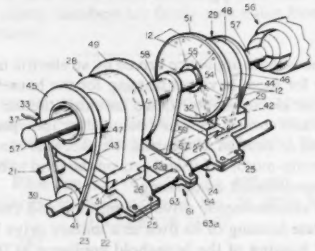
METAL SAWING OR MILLING MACHINE

Walter F. Cousino, 4830 W. Bancroft St., Toledo, Ohio 43615

Continuation-in-part of Ser. No. 822,007, Aug. 5, 1977. This application Nov. 18, 1977, Ser. No. 852,612

Int. Cl.[2] B23B *5/14*

U.S. Cl. 82—71 **5 Claims**



1. Apparatus for concurrently making two axially spaced cuts on an elongated bar stock type workpiece, comprising, in combination:

a. chuck means for grasping a portion of said workpiece;

b. an elongated support underlying the portion of said workpiece projecting outwardly from said chuck means;

c. a pair of annular cutters having cutting teeth formed on their inner annuli;

d. a sleeve secured to each said annular cutter;

e. a pair of sleeve supports adjustable mounted on said elongated support and respectively journalling said sleeves for rotation about the workpiece length axis with both sleeves and cutters surrounding the projecting end of said workpiece;

f. means for concurrently rotating said sleeves; and

g. means for concurrently moving said sleeve supports transversely relative to said workpiece to produce two cuts therein spaced according to the longitudinal spacing of said sleeve supports.

4. Apparatus for concurrently making two axially spaced cuts on an enlongated bar stock type workpiece, comprising, in combination:

a. rotatable chuck means for grasping a portion of said workpiece and rotating same about its length axis.

b. an elongated support underlying the portion of said workpiece projecting outwardly from said chuck means;

c. a pair of annular cutters having cutting teeth formed on their inner annuli;

d. a sleeve secured to each said annular cutter;

e. a pair of sleeve supports adjustably mounted on said elongated support and respectively journalling said sleeves for rotation about an axis parallel to the workpiece length axis with both said sleeves and said cutters surrounding the projecting end of said workpiece;

f. means for concurrently rotating said sleeves; and

g. means for concurrently moving said sleeve supports transversely relative to said rotating workpiece to produce two cuts therein spaced according to the longitudinal spacing of said sleeve supports.

4,116,096

STRIP CUTTER APPARATUS FOR ROLLED SHEET FORMED OF RUBBER

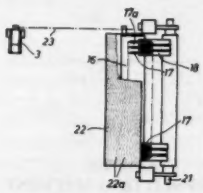
Walter Hugo Schiesser, Zürich, Switzerland, assignor to Schiesser AG, Zürich, Switzerland

Filed Dec. 1, 1976, Ser. No. 746,548

Claims priority, application Switzerland, Dec. 5, 1975, 15865/75

Int. Cl.[2] B23D *19/00*; B26D *1/22*

U.S. Cl. 83—101 **6 Claims**



1. A strip cutter apparatus for rolled sheet formed of rubber and rubber-like material, comprising:

a transport device for transporting the rolled sheet in a predetermined direction of travel; said transport device comprising a conveyor band for the rolled sheet;

a number of adjacently arranged substantially disc-shaped cutters located transversely with respect to the direction of travel of the rolled sheet for cutting the rolled sheet into individual strips;

a roller brush having bristles and arranged after the cutters, viewed in the direction of travel of the rolled sheet;

means for driving said roller brush in the direction of travel of the rolled sheet;

means mounting said cutters to provide intermediate spaces between neighboring said cutters;

said bristles of said roller brush penetrating into the intermediate spaces between said cutters for displacing away from the sides of said cutters material of the rolled sheet which possibly has been lifted by said cutters, and realigning said strips in flat condition on said conveyor band;

said roller brush being arranged above said conveyor band in such a manner that the outer ends of said bristles engage into the intermediate spaces of said cutters up to about the center of said cutters and up to about a plane containing said conveyor band.

4,116,097

CUTTING MACHINE INCORPORATING MEANS FOR TRANSFERRING CUT PARTS AND SCRAP

Gordon Judson Graham, Reading; John Frederick Martin, South Essex, and Douglas Hodgen Crowell, Beverly, all of Mass., assignors to USM Corporation, Farmington, Conn.

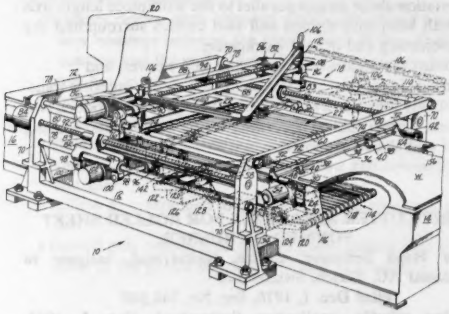
Filed Sep. 6, 1977, Ser. No. 830,459

Int. Cl.[2] B26F *3/00*

U.S. Cl. 83—155 **9 Claims**

1. In a machine for cutting sheet material by means of a fluid jet cutter movable in a plane, a main frame, a cutting bed mounted on the frame to support the sheet material substan-

tially parallel and adjacent to said plane and normal to the jet from the cutter, the bed being comprised of a plurality of



spaced, parallel, taut wires respectively having a tensile strength adequate to fully counter any tendency of the jet to displace successive cutting localities of the material.

4,116,098

GANG SLITTING MACHINE

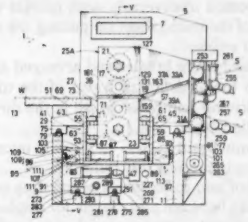
Takashi Suzuki, Sagamihara; Tsutomu Ikezawa, Yokohama, and Kazui Ogasawara, Isehara, all of Japan, assignors to Amada Company, Limited, Japan

Filed Mar. 16, 1977, Ser. No. 778,107

Claims priority, application Japan, Mar. 17, 1976, 51-28916

Int. Cl.² B26D *1/24, 7/26*

U.S. Cl. 83—425.4 **10 Claims**



1. A gang slitting machine for continuously slitting wide sheet material having a given width into a plurality of narrower width strips comprising side frames, supporting plates mounted to said frames substantially at the front and rear sides thereof and spanning therebetween, a plurality of tool carriages movably mounted on said supporting plates, respective upper and lower tool shafts mounted in each tool carriage independently of the tool shafts of other tool carriages, an upper and a lower rotary shearing tool mounted on said upper and lower tool shafts respectively, means associated with said tool carriages for driving said rotary shearing tools, each tool carriage separately including an upper tool-holding member for supporting said upper shearing tool and upper tool shaft and a lower tool-holding member for supporting said lower shearing tool and lower tool shaft and each tool carriage further including means for vertically moving one of said upper and lower tool-holding members relative to the other tool-holding member.

4,116,099

HOUSEHOLD APPLIANCE DRIVEN BY AN ELECTRIC MOTOR, ESPECIALLY SLICING MACHINE FOR FOODS

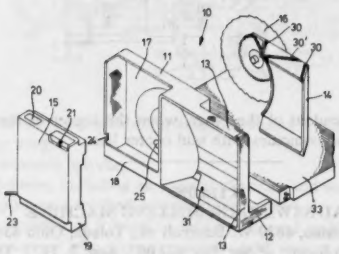
Rolf Mayer, Giengen, Germany, assignor to Bosch-Siemens Hausgeräte GmbH, Stuttgart, Germany

Filed Jun. 27, 1977, Ser. No. 810,206

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1976, 2629352

Int. Cl.² B26D *4/28, 7/00*

U.S. Cl. 83—571 **4 Claims**



1. In a household appliance driven by an electric motor, such as a slicer for food, having a housing for the household appliance and an electric-motor drive mounted therein as well as switching and control elements controlling the operation, and a tool, such as circular blades and the like, that can be moved by the electric-motor drive and acts on the food to be operated on, the improvement comprising,

(a) said electric-motor drive mounted in and enclosed in a separate housing of its own as a unitary drive block,

(b) said housing of the household appliance at the flank of the housing on which the tool is mounted, has an at least approximately prismatic form standing on end,

(c) said housing of the household appliance having a vertical partition wall with the circular blade tool on one side of the partition wall and the drive block on the other side of the partition wall,

(d) a recess in the housing on the side of the housing opposite the tool, for inserting with a tight fit said drive block also having an at least approximately prismatic form,

(e) with said recess equipped with a border member at the base of said housing, which border, together with vertical members of the housing extending from the base of the housing, form a case-like receptacle, and wherein said drive block has a lower section shaped to correspond to the lower end of the receptacle bounded by the border, and wherein the lower end of the drive block engages with said correspondingly shaped lower section of the receptacle bounded by the border,

(f) an opening in the partition wall through which protrudes a drive pinion mounted on the inner side of the drive block facing the circular blade,

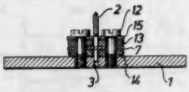
(g) a gear rim on the inside of the circular blade with the drive pinion meshing with the teeth of the gear rim, and

(h) a bayonet joint connection holding the circular blade mounted on the outside of the partition wall of the housing, and the unitary drive block mounted on the other side of the partition wall of the housing to the housing.

4,116,100
DEVICE FOR FASTENING CUTTING DIES ON A BASE PLATE

Martinus Johannes Joseph Witberg, Breda, Netherlands, assignor to Sandvik Aktiebolag, Sandviken, Sweden

Filed Feb. 23, 1977, Ser. No. 771,376
Claims priority, application Sweden, Feb. 24, 1976, 7602191
Int. Cl.² B26F 1/44
U.S. Cl. 83—698 **14 Claims**

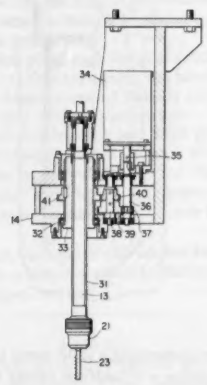


1. A cutting die assembly comprising:
a cutting die including a body portion defining a plane and having an upper cutting edge located substantially in said plane, and a lower part located substantially in said plane;
apertures provided in said body portion of said die;
a base plate having a slot removably receiving said lower part of said die; and
means for fastening the die to the base plate comprising
a plurality of clamp members removably received in respective ones of said apertures for engagement with the die body, said clamp members extending laterally through said apertures above said base plate; and
fastening elements extending into said base plate for releasably securing said clamp members to said base plate such that, in response to release of said fastening elements, said die is removable from said base plate and said clamp members are freely removable from said die apertures.

4,116,101
AUTOMATIC FRET SAWING MACHINES

Hideo Kawakami, Numazu, and Hitoshi Ebata, Mishima, both of Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 22, 1977, Ser. No. 808,880
Claims priority, application Japan, Jun. 24, 1976, 51-73829
Int. Cl.² B27B 19/02
U.S. Cl. 83—747 **1 Claim**

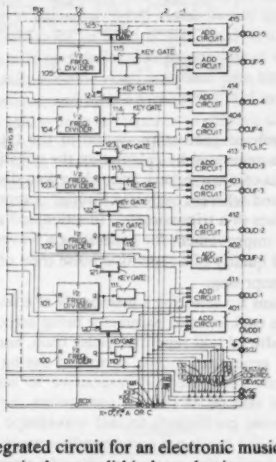


1. In an automatic fret sawing machine adapted to cut a groove of a predetermined profile through a workpiece wherein the workpiece is moved in two orthogonal directions in a plane by a profile control or a numerical control while a fret saw blade is continuously reciprocated in a direction perpendicular to said plane, the improvement which comprises a pair of drive shafts respectively provided with spline portions, mating bushings and connected to opposite ends of said fret saw blade, a pair of pulse motors which are controlled to move in a direction and by an amount designated by said profile control or numerical control, said pulse motors being respectively connected to said drive shafts through said bushings and reduction gear trains for driving said drive shafts, means for synchronously energizing said pulse motors so as to direct said saw blade always in a direction tangential to said profile to be worked, and a clamping member secured to said drive shaft and adapted to clamp one end of the fret saw blade.

4,116,102
INTEGRATED CIRCUIT FOR AN ELECTRONIC MUSICAL INSTRUMENT

Masahiko Tsunoo, Suita; Namio Hirose, Hirakata; Takeji Kimura, Hirakata; Michihiro Inoue, Hirakata, and Masaharu Sato, Noriguchi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Aug. 27, 1976, Ser. No. 718,320
Claims priority, application Japan, Sep. 3, 1975, 50-107180
Int. Cl.² G10H 1/06; H01L 27/02
U.S. Cl. 84—1.22 **6 Claims**



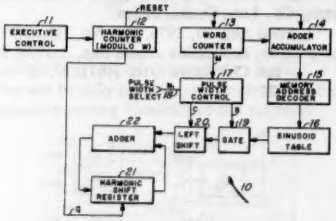
1. An integrated circuit for an electronic musical instrument comprising a single monolithic layer having:
a plurality of input terminals for receiving input signals;
a plurality of frequency divider chains comprising MOSFET's each having an input connected to one of said plurality of input terminals and a plurality of outputs, for producing a plurality of signals each having a frequency that is an integral fraction of the frequency of the signal applied to the respective input terminal;
a plurality of sets of keyer control terminals each set associated with one of said plurality of frequency divider chains, for receiving keyer control signals;
a plurality of sets of keyer-gates each set associated with one of said plurality of frequency dividers and one of said plurality of sets of keyer control terminals, each keyer-gate comprising MOSFET's and a bipolar transistor emitter follower circuit and having an input connected to a respective one of the outputs of said associated frequency divider chain, a control input connected to a respective one of said keyer control terminals of said associated set of keyer control terminals, and and output, for switching on and off the signal applied to the input thereof according to said respective keyer control signal, said keyer-gates being prepared for at least two ranks of feet coupler;
a plurality of output terminals for producing the outputs of said integrated circuit; and
a plurality of adding means comprising a plurality of semiconductor resistors and a bipolar transistor emitter follower circuit each having at least two inputs connected to

the outputs of keyer-gates of different sets having the same rank of feet coupler and an output connected to a corresponding one of said plurality of output terminals, for producing an output signal which is the sum of the signals applied to the inputs.

4,116,103
PULSE WIDTH MODULATION IN A DIGITAL TONE SYNTHESIZER

Ralph Deutsch, Sherman Oaks, Calif., assignor to Deutsch Research Laboratories, Ltd., Sherman Oaks, Calif.

Filed Jul. 12, 1976, Ser. No. 704,244
Int. Cl.[2] G10H *1/02, 5/00*
U.S. Cl. 84—1.24 **10 Claims**



1. In a waveshape generating system of the type wherein waveshapes are generated by calculating the constituent Fourier components of a waveshape according to a discrete Fourier algorithm and wherein each said Fourier component comprises the product of a trigonometric function and a harmonic coefficient, the improvement for generating a waveshape having the spectral quality of a repetitive pulse train of selectable pulse width comprising;

a control means for selecting a member N of a set of control parameters each control parameter being associated with a pulse width of said repetitive pulse train, and

a coefficient generating means, operative during a coefficient computation cycle and responsive to said selected member of said set of control parameters, for providing said harmonic coefficients to said waveshape generating system thereby causing a corresponding waveshape to be generated having the spectral quality of a repetitive pulse train, where said coefficient generating means comprises: a clock generator means wherein timing signals are generated, each said timing signal in said coefficient computation cycle corresponds to a harmonic number *q*, a select means for choosing a member N from a set of pulse width parameters, a width factor means whereby said chosen member N of set of pulse width parameters is scaled by a selected scale factor H to produce a pulse width value N/H, and an address-accumulator means, initialized at the start of said coefficient computation cycle and operative during each computation time interval corresponding to said timing signals for repeatedly adding said pulse width value N/H to sum previously in said adder-accumulator means, whereby the resulting contents of said adder-accumulator means is the argument number *q* N/H.

4,116,104
TOGGLE BOLT WING NUT RETAINER

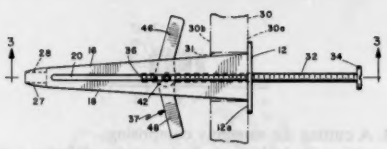
Arvest Gethner Kennedy, 13130 Carriage Rd., Poway, Calif. 92064

Filed Apr. 15, 1977, Ser. No. 787,899
Int. Cl.[2] F16B *37/04*
U.S. Cl. 85—3 S **5 Claims**

1. A wing nut retainer adapted for use in combination with a toggle bolt and a wing nut having a pair of interconnected wings pivotally mounted on a hinge pin on a central nut member for pivoting about an axis transverse to the axis of the bolt, comprising:

a face plate having an aperture therethrough being of a size for the insertion and removal therethrough of a toggle bolt and wing nut mounted thereon when the wings of said nut are oriented along the axis of said bolt:

a pair of guide rails extending from one side of said plate and spaced apart for receiving a wing nut therebetween and including opposed faces defining frictional means for

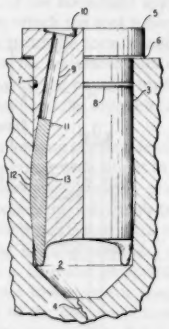


frictionally engaging a single one of the wings of said wing nut off center of the pivotal axis thereof for pivoting said wings about said transverse axis for alignment parallel to the axis of said bolt when moved along between said rails for insertion into and removal from said aperture, and each of said rails including a substantially straight hinge pin receiving slot extending the length thereof and entend entirely through said face plate for retaining said wing nut in position therebetween upon removal of the bolt therefrom.

4,116,105
FASTENER

Hainbuchner Herman, 13910 EnterPrise Ave., Cleveland, Ohio 44135

Filed Jul. 13, 1977, Ser. No. 815,154
Int. Cl.[2] F16B *13/04*
U.S. Cl. 85—66 **8 Claims**

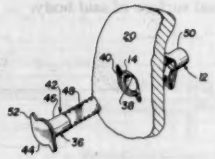


1. A fastener comprising a solid metal cylinder for use with a workpiece having a cylindrical cavity receiving said cylinder, said cylinder provided with a bore hole forming an acute angle with the axis of said cylinder running through said cylinder from one end face to the cylindrical wall thereof and a spent projectile which has been fired into said bore hole from said end face lodged in said bore hole and having a bulged extension disposed between the cylindrical walls of said cavity and cylinder whereby said walls are deformed to the contour of said bulge.

4,116,106
METHOD AND PLUG FOR CONCEALING FASTENER ANCHOR

William P. Barbour, Westminister, Md., assignor to Kile, Gholz, Bernstein & Georges, Arlington, Va., part interest to each

Filed Jun. 14, 1977, Ser. No. 806,448
Int. Cl.[2] E04G 23/02; F16B 13/06
U.S. Cl. 85—71 16 Claims



1. In combination,
(a) an anchor fastener comprising a hollow shaft and a head having a hole therein, said anchor fastener being shaped to receive an anchor bolt fitting through the hole in the head of said anchor fastener and into the hollow shaft, and
(b) a plug for filling the hole left by removal of an anchor bolt from said anchor fastener when said anchor fastener is embedded in an object such that the outer surface of the head of the anchor fastener is beneath the surface of the object forming a depression, and for facilitating the refinishing of the surface of the object, said plug comprising:
(i) a shaft portion the diameter of which is sized to fit into the hole in the head of said anchor fastener and
(ii) a head portion carried by said shaft portion and sized and shaped to fit snugly into and substantially fill the depression in the surface of the object.

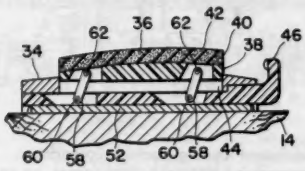
10. In combination,
(a) an anchor fastener comprising a hollow shaft and a head having a hole therein, said anchor fastener being shaped to receive an anchor bolt fitting through the hole in the head of said anchor fastener and into the hollow shaft;
(b) an anchor bolt comprising:
(i) a shaft portion the diameter of which is sized to fit into the hole in the head of said anchor fastener and
(ii) a head portion carried by said shaft portion and
(c) a stepped washer located between the head portion of said anchor bolt and the head of said anchor fastener when said anchor fastener is being embedded in an object, said stepped washer comprising:
(i) a shaft portion sized such that the axially inner face of said shaft portion bears against the head of said anchor fastener but does not extend radially outwardly beyond the head of said anchor fastener and
(ii) a head portion carried by said shaft portion and sized such that the axially inner face of said head portion extends radially outwardly beyond the head of said anchor fastener and, during use, bears against the surface of the object in which said anchor fastener is being embedded,
whereby, during use, the head of said anchor fastener is embedded in the object by a distance equal to the length of the shaft portion of said stepped washer.

4,116,107
STRINGED INSTRUMENT MUTE MECHANISM

James H. Rickard, Harwinton, Conn., assignor to Ovation Instruments, Inc., New Hartford, Conn.

Filed Jan. 19, 1977, Ser. No. 760,735
Int. Cl.[2] G10D 3/04
U.S. Cl. 84—267 7 Claims

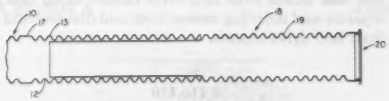
1. The combination with a stringed musical instrument having a body and a set of generally parallel strings which are attached to said body and define a common surface containing said strings and a mute mechanism carried by said body, said mute mechanism comprising a base fixed to said body and located on one side of said common surface and extending transversely across said strings, said base having a recess with a mouth facing said strings, said recess being elongated in the direction transverse of said strings and extending transversely across said strings, a mute received in said recess and having a cross-sectional shape complementary to that of said recess so as to be confined by the walls of said recess to rectilinear sliding movement relative to said base toward and away from said strings, said base also having a slide recess elongated in the direction transverse of said strings, an actuating member received in said slide recess and restrained by the walls of said slide recess to sliding movement relative to said base in said direction transverse of said strings, said actuating member having a handle portion located on one side of said strings and being manually slidable relative to said base between first and second positions, and means for moving said mute toward and away from said strings in response to shifting of said actuating member in opposite directions and whereby said mute engages said strings when said actuating member is in said first position relative to said base and is free of said strings when said actuating member is in said second position relative to said base.



4,116,108
MUSICAL TUBE

Jeffrey M. Hyman, 58 Morton St., Newton Centre, Mass. 02159

Filed Jan. 3, 1977, Ser. No. 756,262
Int. Cl.[2] G10D 7/00, 7/12
U.S. Cl. 84—330 12 Claims

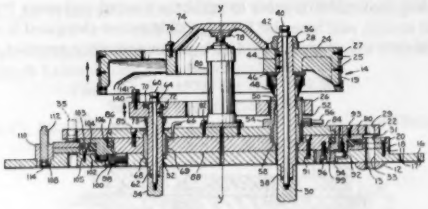


1. A one-piece, elongated, pliant, flexible, open-ended tube of predetermined length having a first end and a second end and being capable of producing musical notes when held in one's hand and swung in a rotary fashion in the air wherein the tube is a corrugated plastic tube having an inner surface and an outer surface and being of predetermined inner and outer diameters, said inner surface comprising a series of interconnected parallel alternate grooves and ridges of uniform dimensions between the ends and along the length of the tube and lateral thereto, and a narrow planar band located between adjacent ridges of the tube and connecting these adjacent ridges together, said band being located near one end but spaced a distance therefrom along the length of the tube whereby to delimit a handle portion for holding the tube during use.

4,116,109
AMMUNITION LOADING MACHINE

Albert W. G. Ervine, Bridgeport, Conn., assignor to Remington Arms Company, Inc., Bridgeport, Conn.

Filed Jul. 29, 1976, Ser. No. 709,811
Int. Cl.[2] F42B 33/02
U.S. Cl. 86—23 12 Claims



1. An ammunition loading machine comprising:

a die set comprising stationary base means, an annular dial having an enlarged central opening and a plurality of peripherally-spaced pocket means for receiving ammunition casings for loading, said base means and said dial being formed with complementary surfaces of revolution, a plurality of roller means spaced about said dial and comprising bearing means each engaging one of said surfaces of revolution to mount said dial on said base means for rotation about a fixed axis for transportation of said pocket means successively to a series of loading stations circumferentially spaced about said axis, and ram means movably mounted on said base means for reciprocation along said axis, said ram means and said base means being adapted for mounting selected tools for performing loading operations on ammunition casings received in said pocket means;

and a drive chassis supporting said base means and comprising indexing means detachably drivingly engaged with said roller means and constructed and arranged to intermittently rotate said dial about said axis to index said pocket means sequentially to said loading stations, drive rod means extending through said base means and said central opening in said dial, detachable connecting means for drivingly engaging said drive rod means with said ram means, and a drive mechanism constructed and arranged for reciprocating said drive rod means and ram means parallel to said axis to perform said loading operations in synchronism with the indexing of said pocket means to said loading stations;

said die set being detachable as a unit from said drive chassis merely by detaching said connecting means and lifting said base means from said drive chassis along said axis to separate said indexing means from said dial and said die set from said drive chassis.

4,116,110
METHOD AND APPARATUS FOR FORMING INTERNAL RECESSES IN A HOLLOW BODY

Jack E. Dines, Fort Worth, Tex., assignor to Jet Research Center, Inc., Arlington, Tex.

Filed Jan. 10, 1977, Ser. No. 758,298
Int. Cl.[2] B23C 1/20, 1/00
U.S. Cl. 90—12 R 8 Claims

1. An apparatus for forming a recess in an internal surface of a body having a hollow interior which comprises:

a housing adapted to be positioned within said interior of said body;

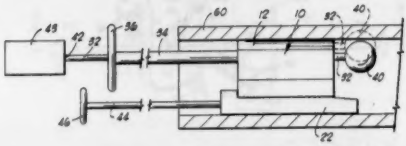
clamping means for rigidly positioning said housing in a desired location within said body wherein said clamping means comprises:

a tapered surface along a side of said housing;

a gib having a tapered surface positioned adjacent to and slidably engaging said tapered surface of said housing whereby relative longitudinal movement between said gib and said housing changes the distance between external opposite surfaces of said gib and said housing; and

means for longitudinally moving said gib with respect to said housing attached thereto so that said external opposite surfaces of said gib and said housing can be selectively wedged against adajcent internal surfaces of said body at desired positions therein;

a mill rotatably attached to said housing for grinding a recess in said internal surface of said body;



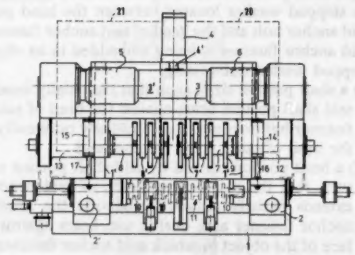
reciprocating means attached to said housing for selectively moving said mill relative to said housing along a line perpendicular to the longitudinal axis of said housing between a position out of contact with said internal surface and a position in contact with said internal surface whereby said mill forms a recess of desired depth in said internal surface; and

power means for rotating said mill.

4,116,111
MILLING APPARATUS

Karlheinz Schmid, Neckartenzlingen, Germany, assignor to Gebrueder Heller Maschinenfabrik GmbH, Nuertingen, Germany

Filed Jan. 18, 1977, Ser. No. 760,253
Claims priority, application Fed. Rep. of Germany, Apr. 24, 1976, 2618093
Int. Cl.[2] B23C 3/06; B24B 5/40; B23B 5/18
U.S. Cl. 90—15 R 5 Claims

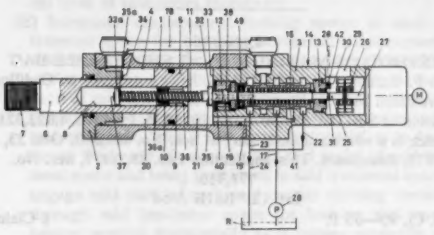


1. A milling apparatus, especially for crankshafts, comprising base means, guide means carried by said base means, a milling unit slidably supported on said guide means, drive means operatively connected to said milling unit for advancing said milling unit back and forth along said guide means, said milling unit including milling cutter arbor means, said apparatus further comprising workpiece chucking means operatively supported on said base means for cooperation with said milling unit, and continuously adjustable bracing means adjustably interconnecting said workpiece chucking means and said milling unit on a side opposite said base means, whereby the instantaneous horizontal spacing between said workpiece chucking means and said milling unit may be maintained substantially rigidly regardless of horizontally effective milling force components.

4,116,112
FLUIDIC AMPLIFIER

Karel Hampejs, Neuhausen am Rheinfall, Switzerland, assignor to SIG Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed Jun. 30, 1976, Ser. No. 701,014
Claims priority, application Switzerland, Jul. 4, 1975, 8752/75
Int. Cl.[2] F15B *9/10*
U.S. Cl. 91—380 **5 Claims**



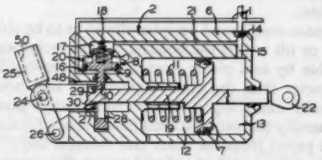
1. In a hydraulic linear amplifier for converting a low-energy rotary movement of a control member into a linear setting movement of a pistion rod of an operating piston mounted in a cylinder for linear movement, wherein said control member is connectable with one end of a rotatably mounted but axially fixed threaded spindle via an input shaft which is coaxial with said spindle and which is mounted so that it is rotatable about and movable along its longitudinal axis; wherein an opposite free end of said threaded spindle extends into an axial bore in said piston rod of said operating piston and through a spindle nut mounted in said axial bore with threads of said threaded spindle matingly engaging said spindle nut; wherein hydraulic pressure for charging said operating piston to produce a setting movement of said piston rod is controllable by means of an axial deflection of a control piston of a control valve which is connected to said cylinder via pressure lines; wherein first means are provided for connecting said control piston to said input shaft for axial movement therewith; and wherein second means are provided for connecting said input shaft to said threaded spindle so that rotation of said input shaft by said control member results in said axial deflection of said input shaft, and hence of said control piston, to cause said setting movement of said piston rod and said setting movement causes said control piston to be axially repositioned to its starting position, said second means including a threaded axial bore formed in said one end of said threaded spindle and engaging a threaded pin on an adjacent end of said input shaft; the improvement further comprising: means, upon the occurrence of interference with the movement of said operating piston, for automatically and nondestructively disengaging said threaded pin and said threaded axial bore after a predetermined amount of relative rotation so that said input shaft can thereafter be freely rotated; and means for aiding in the reestablishment of the mechanical screw conncection between said threaded pin of said input shaft and said threaded axial bore of said threaded spindle upon reversal of the rotary movement of said input shaft.

4,116,113
SPRING ACTUATED BRAKE CYLINDER DEVICE WITH FLUID PRESSURE OPERABLE RELEASE PISTON LOCKOUT MEANS

Serge Leclerc, Sevran, France, assignor to Wabco Westinghouse, Freinville-Sevran, France

Filed Jul. 11, 1977, Ser. No. 814,078
Int. Cl.[2] F15B *15/26*
U.S. Cl. 92—24 **5 Claims**

1. A spring-actuated brake cylinder device of the type comprising brake piston means including a brake piston and a piston rod having a larger-diameter portion at one end opposite an end connected to the brake piston and an axially disposed annular groove formed within said larger-diameter portion at the juncture of said larger-diameter portion with a smaller-diameter portion of the piston rod and extending along the radius of said rod a distance less than the radius of said larger-diameter portion, a brake spring acting on one side of said brake piston means for urging movement thereof in one direction toward a brake-applying position, the opposite side of said brake piston means being subjected to service brake fluid pressure prevailing in a release chamber disposed adjacent said opposite side of the brake piston means and acting in opposition to said brake spring for urging the brake piston means toward a release position, and a locking device which comprises a locking element capable of blocking axial movement of

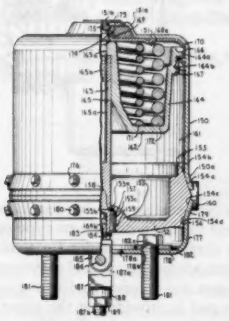


the brake piston means, a locking piston to which said locking element is operably connected, said locking element having a projecting toe engageable in said annular groove in a locking relationship therewith, biasing means for urging said locking piston, and therefore said locking element, toward a locked position in which said annular groove is engaged by said projecting toe, said locking piston being subjected and operable responsively to said service brake pressure at a displacement value commensurate with the value at which said brake spring is effective for initiating movement of the brake piston means out of said release position, said displacement value of said service brake pressure being greater than a locking value thereof at which said biasing means is rendered effective for moving said locking piston and element to said locked position.

4,116,114
DOUBLE PISTON BRAKE ACTUATOR

Kenneth D. Swander, Jr., and Bruce D. Sibley, both of Lawrence, Kans., assignors to Aeroquip Corporation, Jackson, Mich.

Division of Ser. No. 451,916, Mar. 18, 1974, Pat. No. 3,977,308.
This application Apr. 19, 1976, Ser. No. 677,908
The portion of the term of this patent subsequent to Aug. 31, 1993, has been disclaimed.
Int. Cl.[2] F01B *7/00*
U.S. Cl. 92—130 A **3 Claims**



1. Brake actuating mechanism comprising, in combination, a closed housing having inner and outer end walls,

said walls inner and outer with respect to a vehicle brake mechanism,

a piston within said housing adapted to reciprocate inwardly and outwardly therewithin,

means for introducing fluid under pressure to said housing adjacent the outer end wall thereof and to the outer side of said piston,

a brake operating rod on the other, inner side of said piston axially arranged relative thereto and rigidly connected axially thereof at one end of said rod,

said rod projecting through the inner end wall of the housing for reciprocatory movements,

means attaching the other end of said brake operating rod to a pivoted slack adjuster, whereby said rod moves in an arcuate path, thus requiring the said piston to cant or articulate within the housing during reciprocation therewithin,

said piston configured peripherally so as to be able to articulate or tilt within the housing during reciprocation therewithin by said piston having a considerably lesser outer diameter than the inner diameter of said housing and a radially extending circumferential flange positioned peripherally therearound, said flange spaced inwardly on the first piston from the outer end thereof, and

means on the periphery of said piston and cooperating with the housing to maintain continuous circumferential bearing contact and seal therewith during reciprocation,

said latter means comprising, in combination, a hollow-centered circumferential packing cup mounted on the periphery of the piston outboard of the flange on the piston and opening toward the outer pressurized side of said piston, and

a separate circumferential piston bearing removably fixed on the periphery of said circumferential flange on said piston,

said packing cup resting on and backed by said piston bearing.

4,116,115

BELLOWS FOR SEALING OFF THE PISTON ROD PASSAGE IN AN OPERATING CYLINDER

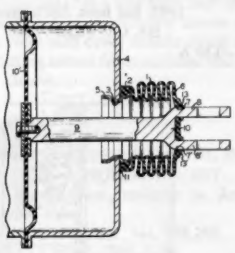
Friedrich Gross, Harenberg; Peter Binder, Wunstorf, and Dieter Brehmer, Hanover, all of Fed. Rep. of Germany, assignors to WABCO Westinghouse GmbH, Hanover, Fed. Rep. of Germany

Filed Mar. 2, 1977, Ser. No. 773,596

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1976, 2613447

Int. Cl.[2] F15J *15/18*

U.S. Cl. 92—168 **5 Claims**



1. A bellows type sealing member for sealing off an opening formed in an end wall of a diaphragm type operating cylinder, in particular a diaphragm cylinder for vehicle air-brake systems, for accommodating reciprocal movement of a piston rod, wherein the piston rod is connected at one end to a diaphragm in the cylinder and is provided at the other end with a forkhead, and the bellows can be fitted on a holding support mounted in said opening in the diaphragm cylinder in the area of the piston rod movement, characterized in that the bellows is provided at one end with an annular portion of torus by which the bellows can be fitted on the holding support and which has a continuous sealing lip along its outer peripheral edge disposed coaxially to the axis of the bellows and which, with the torus fitted in place, lies with an inner surface under tension against a surface of the end wall of the diaphragm cylinder, while the other end, provided with a cover portion which is reinforced in its central area and can be pulled, by way of conforming openings made therein, over respective legs of the forkhead.

4,116,116

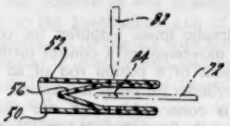
METHOD OF MAKING A HEAT SHRINKABLE BAG

Karl F. Barnett, Bloomfield Hills, Mich., assignor to Cadillac Products, Inc., Sterling Heights, Mich.

Division of Ser. No. 594,807, Jul. 10, 1975, Pat. No. 4,022,321, which is a continuation-in-part of Ser. No. 408,308, Oct. 23, 1973, abandoned. This application Feb. 25, 1977, Ser. No. 771,910

Int. Cl.[2] B31B *1/64*

U.S. Cl. 93—35 R **1 Claim**



1. The method of fabricating a shrink wrap, comprising the steps of: forming a gussetted sleeve-like enclosure; positioning a separator between the opposed portions of each of the gussetted sides of said enclosure proximate to an end of said enclosure when the latter is collapsed to prevent said portions from contacting one another; and applying heat to a localized spot on the plies of said enclosure by piercing said enclosure with a heated needle that is adapted to piece the portions of said enclosure on both sides of said separator as well as said separator whereby localized heat seals are formed between said ply proximate to said end of said enclosure, said heat seals being wholly spaced from the side edges of said collapsed enclosure.

4,116,117

INSTALLATION FOR THERMAL TREATMENT OF CONTAINER-PACKED COMMODITIES

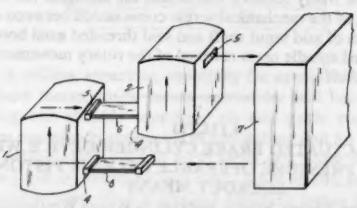
Hendricus Johannes Maria Bogaard, Alkmaar, Netherlands, assignor to Stork Amsterdam B.V., Amstelveen, Netherlands

Filed Apr. 28, 1976, Ser. No. 681,257

Claims priority, application Netherlands, May 7, 1975, 7505435

Int. Cl.[2] A23L *3/04*

U.S. Cl. 99—361 **5 Claims**



1. An installation for thermal treatment of container packed commodities, such as foodstuffs or medicines, comprising:

(A) a plurality of carriers, each for carrying a respective group of containers;

(B) at least two treatment spaces, each having a vertical orientation and having vertical ends, with an inlet at one said vertical end of each said treatment space, and an

outlet at the opposite said vertical end of each said treatment space; between a said treatment space inlet and outlet, said treatment space having a height greater than a stack of carriers containing containers;

(C) means for heating the interior of at least one of said treatment spaces;

(D) vertical moving means in each said treatment space for engaging a said carrier in said treatment space at the vertical level of said inlet thereof and for transmitting that said carrier vertically in said treatment space to the vertical level of said outlet therefrom;

(E) horizontal displacement locking means in each said tratment space for blocking horizontal displacement of said carriers during the vertical displacement thereof from said treatment space inlet to said treatment space outlet; each of said horizontal displacement locking means comprising a vertically extending rod in said treatment space and being of a length and being so located as to be between the levels of said inlet and said outlet of said treatment space and being positioned in said treatment space to engage said rack of each said carrier moving vertically through said treatment space for locking said carrier against moving horizontally as it moves vertically past said rod;

(F) horizontal displacement sluice means connected to said treatment space inlets and to said outlet of one of said at least two treatment spaces, thereby joining said outlet of one said treatment space to said inlet of the other said treatment space; and

(G) horizontal moving members for transmitting said carriers horizontally over said sluice means, said horizontal moving members comprising:

(1) a rack on each said carrier and oriented thereon to extend along the direction of horizontal movement thereof;

(2) rotatable pinion means in each said treatment space and located at the vertical levels of said treatment space at said inlet and said outlet thereof, and positioned and adapted to engage a set rack when the respective said carrier is at said inlet and at said outlet of the respective said treatment space, such that rotation of said pinion means in engagement with said rack moves the respective said carrier into said inlet of said treatment space and out of said outlet of said treatment space.

4,116,118

APPARATUS FOR PREPARING PASTRY

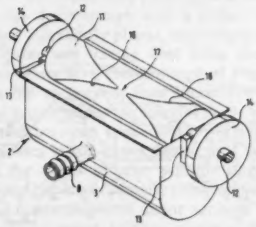
Harry Hon Hai Wong, Kowloon, Hong Kong, assignor to Winner Food Products Limited, Kowloon, Hong Kong

Filed Feb. 25, 1977, Ser. No. 772,075

Claims priority, application United Kingdom, Jul. 21, 1976, 31221/76

Int. Cl.² A47J *37/10, 27/00*

U.S. Cl. 99—423 **5 Claims**



1. Apparatus for the continuous preparation of at least partially cooked pastry, comprising: a substantially cylindrical cooking drum mounted for rotation with its axis substantially horizontal; a roller mounted for rotation with its axis substantially horizontal, the periphery of the roller being adjacent to the periphery of the drum and having at least one recess of constant depth; means for supplying a farinaceous paste to the periphery of the roller in a zone remote from the drum, such that upon rotation of said drum and said roller at the same peripheral speed, paste is repeatedly taken up by the said at least one recess and transferred to the drum in the form of portions; and means for removing said portions from the drum.

4,116,119

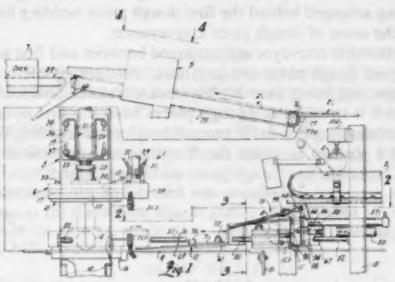
FOOD FORMING APPARATUS

Harvey G. Kuhlman, N56 W21466 Silver Spring Dr., Menomonee Falls, Wis. 53051

Filed Jan. 26, 1977, Ser. No. 762,382

Int. Cl.² A21C *9/06*

U.S. Cl. 99—450.6 **43 Claims**



11. A forming apparatus for producing a partially baked food element from a bulk material, comprising a support plate means having an opening, a heating means secured within said opening and having an upper die surface, a transfer means mounted in overlying spaced relation to said support means and including a raw material support having a forward confining stop wall having a confining position for the raw material and mounted for limited vertical movement to a release position above the confining position and a back confining wall and movable outwardly to move the raw material toward the forward confining stop wall and off the support onto the heating means, a movable forming die means mounted in overlying relation to said heating means and movable into engagement with said heating means for pressing said material, and means for moving said transfer means longitudinally between said die means and said heating means with said die means spaced from said heating means, and then moving the raw material onto the heating means and thereafter raising the confining wall and retracting the transfer means.

4,116,120

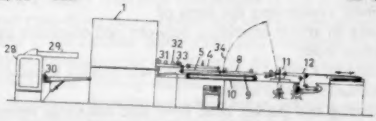
CONVERTIBLE DOUGH MAKEUP LINE FOR THE PRODUCTION OF DIFFERENT KINDS OF BREAD

Kate Kemper, Wybüelstrasse 6, 8702 Zürich-Zollikon, Switzerland

Filed Sep. 27, 1976, Ser. No. 726,530

Int. Cl.² A23C *3/02*

U.S. Cl. 99—483 **15 Claims**



1. A convertible dough makeup line for the mechanized processing of a mass of bread dough into dough pieces of at least two different shapes, in the selective production of different kinds of bread in a production line baking operation, the dough makeup line comprising in combination:

a head unit, including means for dividing the bread dough

into a regular succession of dough pieces and means for rounding the dough pieces;

a proofing unit succeeding the head unit in the sense of dough piece conveyance, the proofing unit including means for receiving the rounded dough pieces from the head unit, for proofing them, and for delivering proofed dough pieces at a discharge station;

a first dough piece molding line succeeding the proofing unit, said line including means for conveying the dough pieces and simultaneously shaping them into loaves, said means being adjustable so as to convey the dough pieces without reshaping them;

a second dough piece molding line including means for conveying the dough pieces and simultaneously shaping them to a flat shape, the second dough piece molding line being arranged behind the first dough piece molding line, in the sense of dough piece conveyance;

a displaceable conveyor unit arranged between said first and second dough piece molding lines; the displaceable conveyor unit being movable between a transfer position in which it transfers the dough pieces from the first dough piece molding line to the second dough piece molding line and a position in which the dough pieces are allowed to fall from the first dough piece molding line; and

means arranged underneath the first dough piece molding line for receiving the falling dough pieces and for removing them to a baking oven.

4,116,121

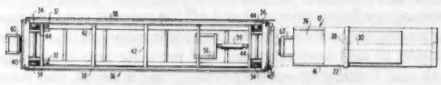
METHODS FOR LOADING REFUSE

Harvey W. Liberman; Paul L. Goranson, both of Knoxville; R. Houston Ratledge, Jr., Maryville, and John C. Salyers, Oak Ridge, all of Tenn., assignors to Carrier Corporation, Syracuse, N.Y.

Division of Ser. No. 641,375, Dec. 17, 1975. This application May 19, 1977, Ser. No. 798,732

Int. Cl.[2] B30B *13/00*

U.S. Cl. 100—39 **9 Claims**



1. In a method of transferring refuse from a hopper to a container wherein the container is positioned adjacent a refuse discharge opening of said hopper, refuse is introduced into the hopper through a refuse inlet opening of said hopper spaced from the discharge opening, a packer head is reciprocated within said hopper to displace such refuse through said discharge opening and into said container, and a clearing member is positioned for vertical reciprocation across said discharge opening; said packer head being spaced below a top wall of said hopper to define therebetween a gap which may tend to become occupied by an elongate refuse article extending between said container and said refuse inlet in a manner resisting transfer of said elongate article into said container; the improvement comprising the steps of:

sensing an article extending between said container and said refuse inlet;

generating a signal in response to said sensing to indicate the presence of said article;

retracting said packer head from said discharge opening;

lowering said clearing member into contact with said article to displace said article downwardly;

raising said clearing member;

advancing said packer head toward said discharge opening to shift said article toward said container; and

repeating said steps of retracting, lowering, raising, and advancing at least until said article has cleared said refuse inlet.

4,116,122

HYDRAULIC DRIVEN PRESS

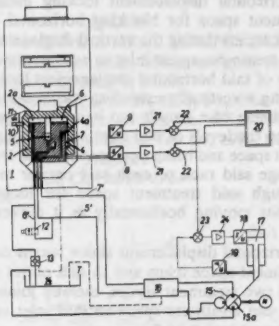
Ernst Linder, Bellach, and Kurt Thut, Schnottwil, both of Switzerland, assignors to Osterwalder AG, Lyss, Switzerland

Filed Oct. 11, 1977, Ser. No. 840,948

Claims priority, application Fed. Rep. of Germany, Oct. 11, 1976, 2645849

Int. Cl.[2] B30B *15/16*

U.S. Cl. 100—48 **7 Claims**



1. A hydraulic driven press for embossing, bending, stamping, especially for precision blanking, comprising:

support means;

a ram guided in said support means;

pressure chambers and a piston provided for said ram;

said ram being supported at said support means by said pressure chambers and said piston;

said pressure chambers comprising at least one actuation pressure chamber and a counter pressure chamber;

means for supplying a pressurized medium to said actuation pressure chamber and said counter pressure chamber;

means for measuring and determining the displacement path of the ram and the ram speed and the quantity of delivered pressurized medium and for delivering measurement values representative of such measurement operations;

a regulation device for regulating the ram movement as a function of the measurement values measured by said measuring means.

4,116,123

COMPACTING APPARATUS

Mervin Ramer, Cushing, Okla., assignor to Lawrence Murray, Perkins, Okla.

Filed Mar. 29, 1977, Ser. No. 782,493

Int. Cl.[2] B30B *9/32*

U.S. Cl. 100—233 **13 Claims**

1. An apparatus for compacting an object, comprising:

a base having a forward section and a rear section, the forward section forming a lower jaw;

a lid member having a forward section and a rear section, the forward section forming an upper jaw, the lid member

pivotally connected to the base at a pivot disposed intermediate to the forward and rear sections of the lid member, the upper jaw substantially overlaying the lower jaw of the base and disposed a preselected distance therefrom in a closed position of the lid member, the upper jaw removed from the lower jaw of the base in an open position of the lid member;

a toggle linkage member having a first end and a second end, the first end pivotally connected to the rear section of the lid member; and

means for moving the second end of the toggle linkage member alternatively in a first direction toward the lower jaw and in a second direction away from the lower jaw, the lid member moved toward the open position when the second end of the toggle linkage member is moved in the first direction, and the lid member moved toward the closed position when the second end of the toggle linkage member is moved in the first direction, wherein the means for moving the second end of the toggle linkage member is characterized as comprising:

a longitudinal guideway supported by the base;

a reciprocating member supported by the guideway, the reciprocating member movable along the guideway alternatively in the first direction and in the second direction, the second end of the toggle linkage member pivotally connected to the reciprocating member; and

means for moving the reciprocating member in the first direction and in the second direction.

4,116,124

TWO-SIDED SIMULTANEOUS PRINTING METHOD

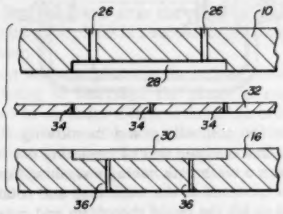
Harold Frederick Farrow, Hitchin, and Bernard Booth Rackstraw, High Wycombe, both of England, assignors to Encoline (Process) Limited, England

Continuation of Ser. No. 682,184, Apr. 30, 1976, abandoned, which is a continuation of Ser. No. 548,558, Feb. 10, 1975, abandoned. This application Sep. 22, 1977, Ser. No. 835,585

Claims priority, application United Kingdom, Feb. 20, 1974, 7816/74

Int. Cl.² B41M *1/10*; B41F *1/20*

U.S. Cl. 101—170 **5 Claims**



1. A method of simultaneously printing both sides of a gasket having feed holes therethrough with a sealant material comprising providing a generally planar, impervious gasket having two major surfaces and having feed holes therethrough of sufficient size to allow flow therethrough of a sealant material under pressure but to prevent flow therethrough when said sealant material is only under the force of gravity, locating said impervious gasket between upper and lower printing intaglio plates with recesses in the plates facing said two major surfaces, moving the upper intaglio printing plate toward the gasket and toward the lower intaglio printing plate to initiate a printing stroke, contacting said major surfaces of the gasket with said upper and lower printing plates with the recesses facing the gasket to create an enclosure of the recesses of said printing plates with the feed holes of said gasket providing fluid communication between the recesses, forcing the sealant material to be printed through the upper intaglio printing plate from a piston pump injector unit into the recessed design facing the gasket, through the feed holes in the gasket, to the recess in said lower intaglio printing plate located on the other side of the gasket from the upper intaglio plate, bleeding the air in said recesses out from the plates as said recesses are filled with the sealant material to be printed, passing the air being bled out of the recesses through air bleed holes in said lower intaglio printing plate, moving the upper intaglio printing plate away from the printed gasket to complete the printing stroke, removing the printed gasket from between said intaglio printing plates, and preventing sealant material from flowing through the feed holes in the gasket under gravity by said size of the feed holes in the gasket.

4,116,125

CONTROL SYSTEM FOR POSITIONING UNITS EXHIBITING DEAD TIME IN THEIR RESPONSE TO ACTIVATING SIGNALS

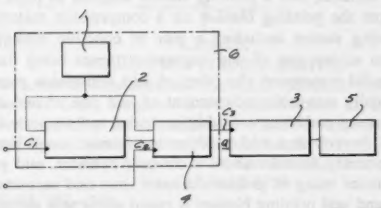
Karl-Heinz Förster, Dresden, and Werner Lein, Radebeul, both of German Democratic Rep., assignors to Veb Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, German Democratic Rep.

Filed Mar. 29, 1977, Ser. No. 782,544

Claims priority, application German Democratic Rep., Mar. 29, 1976, 192088

Int. Cl.² B41F *13/24*

U.S. Cl. 101—212 **9 Claims**

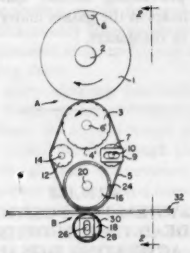


1. An improved control system for a variable-speed cyclically operating printing machine, the control system being of the type including a clocked control unit receiving printing-machine-synchronized clock signals and being operative in dependence thereon for generating activating signals, the control system furthermore including at least one positioning unit connected to receive activating signals from the clocked control unit but exhibiting a dead time in its response to activating signals, the duration of the dead time not varying linearly with the speed of operation of the printing machine, whereby the fraction of a printing-machine operating cycle constituted by the duration of the dead time varies as the speed of operation of the printing machine varies, the improvement comprising the provision of pulse-generating means operative for generating pulses corresponding to angular increments in the angular position of a rotary reference component of the printing machine; and time-delay means connected to the pulse-generating means and to the clocked control unit and operative for automatically compensating for variations in the fractional relationship between the printing-machine operating-cycle duration and the dead-time duration by introducing, into the transmission of an activating signal from the clocked control unit to the positioning unit, a compensatory time delay whose duration offsets variations in the fractional relationship, the time-delay means comprising calculating and converting means operative for calculating from the pulses a digital value indicative of the compensatory time delay needed to offset variations in the fractional relationship and operative for converting the calculated value into said compensatory time delay.

4,116,126
APPARATUS FOR PRINTING ON COMPRESSIBLE MATERIAL

Donald L. Milner, 766 Brookside Cir., Elmira, N.Y. 14903

Filed Oct. 4, 1976, Ser. No. 729,200
Int. Cl.[2] B41F *7/02*
U.S. Cl. 101—217 1 Claim



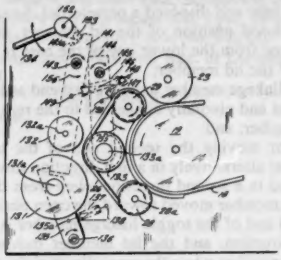
1. Apparatus for printing on compressible material without compression or distortion thereof, including in combination, a continuous traveling printing blanket, an image transfer station including means mounting a printing plate, pressure means coactive therewith and said printing blanket traveling between said means and said pressure means and in contact with said printing plate for transfer to an image therefrom to the printing blanket, the means and the pressure means having noncompressible surfaces, and a printing station adapted to print an image from the printing blanket on a compression material, said printing station including a pair of coactive rotatable impression means, one of said impression means being fixed against radial movement, the other of said impression means being radially moveable independent of said one of said impression means and being rotatably journaled and supported at each end thereof, and said coactive impression means comprises a primary cylinder and a secondary cylinder, said primary cylinder being of greater diameter than said secondary cylinder and said printing blanket is raised about said primary cylinder and in printing contact with said traveling compressible material and said primary cylinder is of the same diameter as said pressure means, and said means and said pressure means are rotatable cylinders and said impression means are rotatable cylinders having cushioned surfaces and the length of said continuous printing blanket is substantially the same as the circumferential dimension of said means which mounts a printing plate, said means being a single cylinder, the axes of the means mounting a printing plate, the pressure means and the primary and secondary cylinders being in the same projected plane.

4,116,127
TICKET COUNTER AND ENDORSER

George P. McInerny, Andalusia, Pa., assignor to Brandt-Pra, Inc., Cornwells Heights, Pa.

Division of Ser. No. 632,318, Nov. 17, 1975, Pat. No. 3,998,451, which is a division of Ser. No. 465,700, Apr. 30, 1974, Pat. No. 3,944,210. This application Sep. 27, 1976, Ser. No. 726,830
Int. Cl.[2] B41F *13/24*
U.S. Cl. 101—232 5 Claims

1. An endorser assembly for use in apparatus for feeding sheets arranged in a stack in a predetermined direction and having a closed loop feed belt and roller means for supporting the belt and second closed loop belt means and a group of roller means supporting said second belt means for urging the second belt means toward the feed belt, the feed belt and second belt means cooperatively defining an arcuate path for guiding and moving documents therebetween; said endorser assembly comprising endorser means driven by said second belt means for endorsing documents as they pass between the feed belt and the second belt means; means for selectively

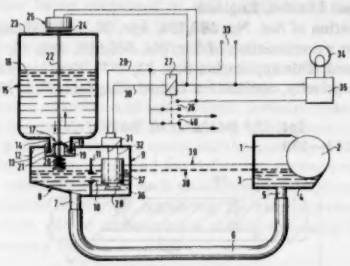


positioning said endorser means in either an engaging or displaced position with regard to said documents.

4,116,128
DEVICE FOR CONTROLLING A WASHING LIQUID LEVEL IN A WASH TANK OF A PRINTING MACHINE

Werner Lehmann, Gutach; Horst Purr, Teanenbronn, and Herrmann Raible, St. Georgen, all of Germany, assignors to Mathias Bäuerle GmbH, Germany

Filed May 12, 1977, Ser. No. 796,187
Claims priority, application Fed. Rep. of Germany, May 14, 1976, 2621804
Int. Cl.[2] B41F *35/00*
U.S. Cl. 101—425 4 Claims



1. A device for controlling and monitoring the level of washing liquid in a washing unit of a printing machine, which machine includes a wash tank having a washing liquid therein, a pickup roller mounted in the wash tank and rotatable in the washing liquid to lift the liquid therefrom and move it on the roller surface above the liquid level to transfer it to a rubber blanket roller to be cleaned, comprising a control tank adapted to be located alongside the wash tank at substantially the same level thereof and having a connection to the wash tank connected to the wash tank at a location below the level of the liquid in the wash tank, a supply tank for washing liquid located above said control tank, a supply conduit connection from said supply tank to said control tank, an electromagnetically actuable valve having a prtion in said supply conduit connection for regulating the flow through said conduit connection to said control tank, a float switch mounted on the liquid in said control tank and connected to said valve to open and close said valve so as to maintain the level of liquid in said control tank at a predetermined amount and thereby to regulate the level of liquid of said wash tank correspondingly by flow between said control tank and said wash tank through the connection therebetween, and a partition wall in said control tank having an opening therethrogh located below the level of liquid in said control tank, said float switch being located on one side of said partition wall to cause a time-delay in the action of said float switch and the other side of said partition

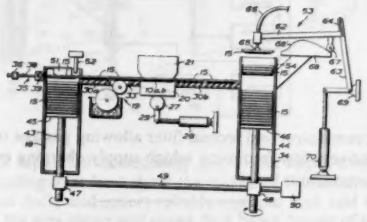
wall being connected to said supply tank and said connection to the wash tank.

4,116,129

METHOD FOR PRINTING COMBINATIONS OF SIGNS IN A PREDETERMINED NUMBER AND IN AN IRREGULAR SEQUENCE

Uno Arne Ivan Ståhl, Eksjögatan 10, and Nils Magnus Håkansson, Allmänningsgatan 5, both of S-253 51 Helsingborg, Sweden

Filed Aug. 4, 1976, Ser. No. 711,652
Claims priority, application Sweden, Aug. 8, 1975, 7508950
Int. Cl.[2] B41L *47/46*
U.S. Cl. 101—426 3 Claims



1. A method for printing a predetermined number of signs in a plurality of different successive sequences and in an irregular and unpredictable order in each sequence, wherein in each sequence the signs are assembled in a nonrepetitive order that is different from the order in preceding and succeeding sequences, which comprises the steps of

(a) providing the signs on a number of plates, each plate carrying at least one sign;
(b) arranging the plates in a first order;
(c) feeding the plates one at a time to a printing station;
(d) printing with the plates in the first order at said printing station;
(e) collecting the plates after the printing, and
(f) rearranging the plates in a second order different from the first order;
(g) printing with the plates in the second order;
(h) continuing to rearrange the plates in each successive sequence to an order different from the order in the preceding and succeeding sequences; and printing with the plates in each sequence in an unpredictable order that is nonrepetitive in successive sequences.

4,116,130

METHODS AND APPARATUS FOR SEVERING TUBULAR MEMBERS

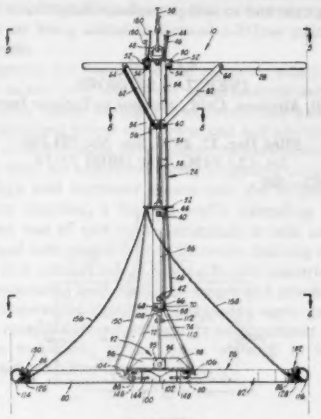
Glenn B. Christopher, and John A. Regalbuto, both of Fort Worth, Tex., assignors to Jet Research Center, Inc., Arlington, Tex.

Filed Apr. 4, 1977, Ser. No. 784,096
Int. Cl.[2] E21B *29/02*
U.S. Cl. 102—20 20 Claims

1. A method of severing a tubular member comprising the steps of:

placing a tool within the interior of said tubular member at the point where it is desired to sever said member, said tool including a remotely extendible framework formed of a pair of hinged semicircular parts which when extended move from a folded vertical position to an unfolded horizontal position having one or more remotely detonatable shaped charges attached thereto, said tool and framework being of a size such that when said framework is not extended, said tool readily passes through said tubular member and when extended, said framework is positioned transversely to the axis of said member and said shaped charges are positioned adjacent the interior walls of said member;

extending said framework after said tool has been placed



within said member so that said shaped charges are positioned adjacent the interior walls of said member at said point where it is desired to sever said member; and

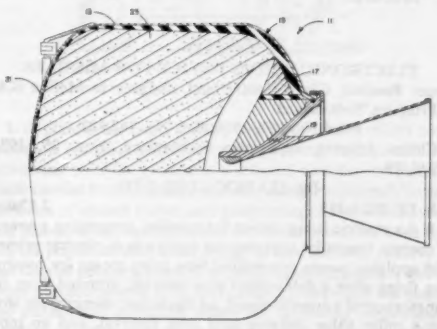
detonating said charges thereby severing said member.

4,116,131

SOLID PROPELLANT MOTOR

John I. Shafer, Pasadena, and Harold E. Marsh, Jr., La Canada, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 13, 1970, Ser. No. 48,621
Int. Cl.[2] F42B *1/00*
U.S. Cl. 102—103 8 Claims



1. A long-burning, case bonded, end burning solid propellant motor having a maximum acceleration of less than 1 g comprising:

an outer motor case,

an end burning solid propellant charge bonded to said case, said propellant having an elongation at maximum stress of 85 to 400 percent and a secant modulus of from 175 to 5 psi, and comprising a minor amount of an elastomeric binder including a prepolymer having a molecular weight from 1000 to 5000 containing reactive terminal functional groups, a difunctional compound reactive with said groups, at least one trifunctional compound and a monofunctional compound to form a lightly cross-linked elasto-

meric network and a major amount of a solid particulate oxidizer salt,

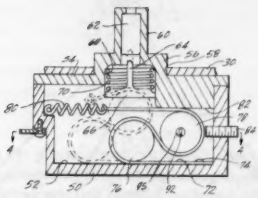
an insulative liner comprising a rubber binder containing heat insulation fillers bonded to the inner walls of said motor case and to said propellant charge.

4,116,132

INERTIAL SENSORS

Lon E. Bell, Altadena, Calif., assignor to Technar Incorporated, Calif.

Filed Dec. 17, 1976, Ser. No. 751,880
Int. Cl.[2] F42C *1/04*; H01H *35/14*
U.S. Cl. 102—200 **18 Claims**



1. A sensor responsive to a predetermined level of acceleration force or deceleration force acting on an associated structure when said sensor is properly mounted to said structure, said sensor comprising:

a linearly movable mass including a first section;

firing means including a firing element for actuation of a mechanism;

means urging said first section into operative engagement with said firing means;

mounting means for mounting said sensor to said associated structure;

releasable safety interlock means normally preventing said mass from operative engagement with said firing means; and

means for automatically releasing said safety interlock means upon proper mounting of said sensor to said associated structure.

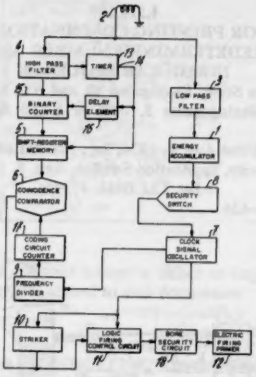
4,116,133

ELECTRONIC FIRING DEVICE FOR MISSILES

Roger Beuchat, Gland, Switzerland, assignor to Mefina S.A., Fribourg, Switzerland

Filed Nov. 17, 1976, Ser. No. 742,422
Claims priority, application Switzerland, Nov. 25, 1975, 15240/75
Int. Cl.[2] F42C *11/06, 9/00*
U.S. Cl. 102—215 **2 Claims**

1. An electric firing device for missiles, comprising a source of energy, means for applying the energy to an electric primer, said applying means comprising time delay means for controlling firing after a determined time interval, counted from the appearance of a control signal, an electronic memory for storing a pulse value defining said time interval, and an input circuit to receive a signal representing said time interval, wherein said input circuit is connected to a coded selective filter supplying to the memory a coded pulse value defining said time interval, and said time delay means comprises an oscillator supplying clock signals, a coding circuit receiving the clock signals and transferring them into the same code as that of the coded signal applied to the memory, a comparator connected to the memory and to the coding circuit to supply a firing signal when there is a coincidence, said energy source supplied through said input circuit to an accumulator chargeable before use of the missile, said input circuit comprising means for receiving input signals which supply energy to the accumulator and represent said time interval, said coded selective filter being disposed between said receiving means and said memory and allowing passage to said memory of signals of relatively high frequency which represent said time interval, and a second filter disposed between said receiving means and



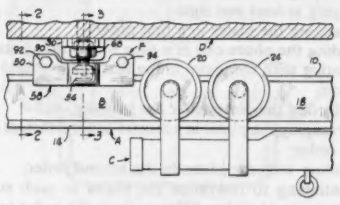
the accumulator, said second filter allowing passage of signals of relatively low frequency which supply charging energy to the accumulator.

4,116,134

HANGERS FOR OVERHEAD SUSPENDED TRACK

Paul H. Troth, Euclid, Ohio, assignor to McNeil Corporation, Akron, Ohio

Filed Mar. 3, 1977, Ser. No. 773,830
Int. Cl.[2] E01B *25/24*
U.S. Cl. 104—111 **1 Claim**



1. In an overhead suspended rail-type material handling apparatus, a rail comprising a web and transversely extending flanges on both sides of said web adjacent to the opposite edge thereof, a cleat member including a plate-like part for attachment to an overhead structure and a hanger part projecting from the plate-like part provided with an enlargement adjacent to one of its free ends having a semi-spherical bearing surface facing the plate-like part, a pair of clamp plates of similar shape orientated lengthwise of said rail and having recesses facing one another providing a spherical-like aperture therebetween the walls of which enclose said enlargement at the projecting end of said hanger part and a T-slot at each opposite side of said plates that intersect the spherical-like aperture the walls of which T-slots engage about the narrower flanges on a part of said rail, and means securing said clamp plates together.

4,116,135

SLIDING SCREEN CLOSURE FOR RAIL CARS

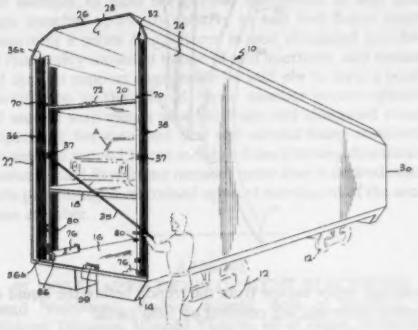
William M. Jaekle, Moraga; Robert Byrne, San Carlos, and Armand Giovanelli, San Francisco, all of Calif., assignors to Southern Pacific Transportation Company, San Francisco, Calif.

Filed Nov. 1, 1976, Ser. No. 737,543
Int. Cl.[2] B61D *17/06*
U.S. Cl. 105—378 **7 Claims**

1. In a railroad car for carrying automobiles, which includes

a chassis having a lower deck and at least one upper deck spaced above said lower deck, protective side walls, and at least one open end, the improvement comprising:

a gate having a plurality of vertical frame members, a flexible screen supported on said frame members, and a plurality of rollers attached to said frame members; and



a track supported immediately under said upper deck and extending to at least about the middle of the width of the upper deck, said rollers rollably engaged with said track, and the area above said upper deck being devoid of means for guiding and supporting said gate in its movement away from the side portion of the upper deck, whereby said gate can be moved to one side of the decks to leave the decks free to move automobiles onto and off from the decks.

4,116,136

METHOD OF AND FURNACE FOR BURNING WASTE MATERIAL

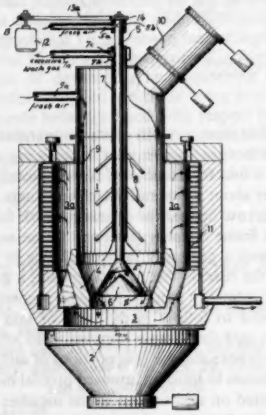
Heinz Mallek; Werner Jablonski, both of Linnich, Tetz, and Peter Pelzer, Niederzier, Obz., all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich, Gesellschaft mit beschrankter Haftung, Jülich, Fed. Rep. of Germany

Filed Feb. 2, 1977, Ser. No. 764,915

Claims priority, application Fed. Rep. of Germany, Feb. 5, 1976, 2604409

Int. Cl.[2] F23G *5/12*

U.S. Cl. 110—251 **5 Claims**



1. A method of burning waste material, which includes in combination the steps of: heating said waste material while preventing access of air thereto to thereby form waste gases and degasified waste, passing in a flow the thus formed waste gases and degasified waste to an area of combustion and constricting said flow in a location prior to its reaching said area of combustion while admixing fresh air to said flow where said flow is being constricted so that by way of admixing fresh air to the constricting location both the waste gases and degasified waste are combusted in common at the constricting location, said fresh air being added to flow at a below stoichiometric quantity ratio.

3. A furnace for burning waste material, which includes: container means for receiving the waste material to be burned, said container means having a lower open end, a combustion chamber arranged below said lower end and provided with a normally closed bottom, first conduit means connectable to a source of fresh air and substantially extending coaxially with and through said container means into the vicinity of said combustion chamber, a furnace muffle extending from said lower open end of said container means to said combustion chamber and with said first conduit means defining a constriction, said first conduit means leading to said constriction, flue means surrounding said container means and communicating with said combustion chamber for releasing waste gases therefrom, and rotatable means arranged in said container means for aiding the movement of the waste material to be burned through said container means.

4,116,137

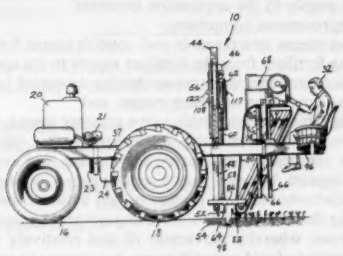
PLANTER FOR TREES, HERBS, SHRUBS AND SIMILAR PLANTS

Henry Westerhoven, 2030 S. Bainbridge Ctr. Rd., Benton Harbor, Mich. 49022

Filed May 25, 1977, Ser. No. 800,409

Int. Cl.[2] A01C *11/00*

U.S. Cl. 111—2 **7 Claims**



1. A planter for trees, shrubs, herbs and similar plants comprising a chassis, wheel means supporting said chassis for movement over the ground in a selected direction of travel, a blade carried by said chassis and extending transversely to said direction of chassis travel, said blade being shiftable relative to said chassis along said direction of chassis travel between fore and aft positions, said blade being further shiftable relative to said chassis between a lower ground engaging position and an upper position spaced from said ground, a conveyor carried by said chassis and including means for releasably supporting a plurality of plants in a row extending transversely to the direction of said chassis travel, means for shifting said blade from its said upper and fore positions into its said lower and aft positions for forming a trough in said ground transversely relative to the direction of chassis travel, said conveyor having one end located rearwardly of and extending to adjacent said blade in its lower and aft positions, means for rotating said conveyor to position said plant supporting means at said trough with the plants extending into the trough, said blade shifting means for shifting said blade from its lower and aft trough forming positions into its upper and fore positions and thereafter again into its lower and aft positions adjacently forwardly of said trough to cover said trough and the plants where they extend therein and simultaneously form another trough paralleling and located forwardly of said first mentioned trough, and means for

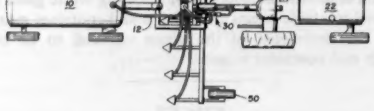
rotating said wheel means to move said chassis forwardly to position said conveyor one end adjacent said other trough whereby said conveyor may be rotated to position said plant supporting means at said other trough with additional plants being carried thereby extending into said other trough.

4,116,138

AUTOMATIC FLUID FERTILIZER CONTROL APPARATUS

David Lee McFarland, P.O. Box 154, and Raymond Joseph McFarland, P.O. Box 457, both of Gwinner, N. Dak. 58040

Filed Mar. 4, 1977, Ser. No. 774,512
Int. Cl.[2] A01C *23/02*
U.S. Cl. 111—7 **12 Claims**



1. In a fluid fertilizer application system of the type comprising:

a fertilizer supply;

an implement having fertilizer application elements;

means for moving said application elements between a lowered, application position and a raised, transport position; and conduit means for delivering fertilizer from the fertilizer supply to the application elements;

the improvement comprising:

valve means interposed in said conduit means for delivering fertilizer from the fertilizer supply to the application elements, said valve means having a control lever having projection engaging means; and

collapsible and extendable valve actuator means, at least a portion of which is movable relative to said valve means in response to said means for moving said application elements between raised and lowered positions, said relatively movable portion of said actuator means having thereon a projection for engagement by said control lever, whereby movement of said relatively movable portion of said actuator means in response to said means for moving said application elements causes the projection on said actuator means to engage and to move said control lever such that said valve means is open when the application elements are in said lowered position and closed when the application elements are in said raised position.

4,116,139

COLD FLOW LIQUID VAPOR SHOE

Clement J. Sauer, Evansville, Ind., assignor to Chem-Farm Inc., Evansville, Ind.

Filed May 19, 1977, Ser. No. 798,573
Int. Cl.[2] A01C *23/02*
U.S. Cl. 111—7 **14 Claims**

1. A shoe for use with an earth plow having at least one chisel blade mounted upon a chisel shank and adapted to move through field earth so as to create a trench, the shoe comprising means for applying and at least temporarily holding ammonia in the soil, the means including, a vapor tube for receiving ammonia vapor, a vapor tube orifice defined in the vapor tube for dispensing the received ammonia vapor, a liquid tube for receiving ammonia liquid, and a liquid tube orifice defined in the liquid tube and located above and to the rear of the vapor tube orifice for dispensing liquid ammonia in a path that intersects from above the path of discharge of the previously dispensed ammonia vapor as the plow chisel moves through the ground and forms the trench, so as to encourage the liquid ammonia to act as a fluid blanket to the ammonia vapor and to

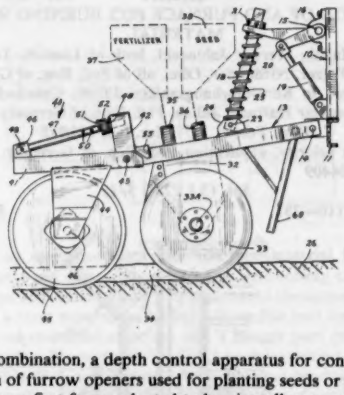
discourage vapor escape from the trench before the liquid and vaporous ammonia are covered by field earth.

4,116,140

PRESS WHEEL DEPTH CONTROL FOR GRAIN DRILL FURROW OPENERS

Joseph A. Anderson, and Chester G. Neukom, both of Jamestown, N. Dak., assignors to Haybuster Manufacturing, Inc., Jamestown, N. Dak.

Filed Dec. 9, 1976, Ser. No. 749,051
Int. Cl.[2] A01C *5/00*
U.S. Cl. 111—52 **3 Claims**



1. In combination, a depth control apparatus for controlling the depth of furrow openers used for planting seeds or the like comprising a first frame adapted to be pivotally mounted to a prime mover about a generally horizontal axis at a leading end thereof; a furrow opener for opening a path for seed mounted on said first frame member; a second frame member pivotally mounted about a generally horizontal axis to said first frame member to the rear of said furrow opener; a ground engaging press wheel rotatably mounted on said second frame member and positioned to follow in the path of said furrow opener mounted on said first frame member, said wheel being positioned closely adjacent the rear portions of said furrow opener; adjustable means to limit the upward pivotal movement of said wheel mounted on said second frame member relative to said first frame member about the pivot between the first and second frame members to retain said wheel in position engaging the ground as the furrow opener enters the ground to control the depth of said furrow opener, said adjustable means to limit the upward movement comprising an elongated member pivotally mounted on said second frame member to the rear of the rotational axis of said wheel, a fixed upright support mounted

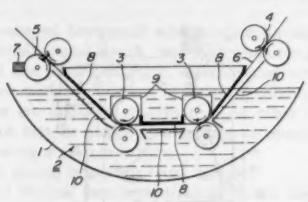
on said first frame member including means spaced above said first frame to slidably receive said elongated member in said upright support member to permit relative sliding between the elongated member and upright support as the second frame member pivots relative to the first frame member, and means to limit the travel of said elongated member relative to the support member to limit the pivotal movement of said second frame member upwardly relative to said first frame member comprising a series of apertures in said elongated member, a pin removably mounted in one of said apertures, and means on said upright support engageable by said pin to form a positive upward stop as the second frame member pivots upwardly; and second stop means separate from said elongated member cooperating between said first and second frame members to prevent said second frame member from pivoting downwardly relative to said first frame member more than a desired amount while permitting unrestrained upward movement of the second frame member.

4,116,141

PLATE SHAPED DEVELOPMENT ELECTRODE

Masaji Nishikawa; Yoshiro Suzuki, both of Hachioji, and Noboru Takasugi, Higashi-Yamato, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 18, 1977, Ser. No. 770,502
Claims priority, application Japan, Feb. 23, 1976, 51-17972
Int. Cl.[2] G03G *15/06*
U.S. Cl. 118—648 **5 Claims**



1. A device for developing an electrostatic latent image produced on a record sheet, which travels along a path, by means of electrically charged particles dispersed in a developing liquid, comprising at least one pair of developing and squeezing rollers arranged along said path and bringing the electrostatic latent image produced on the record sheet into contact with the developing liquid, said rollers being in contact with the surface of said record sheet, and at least one plate-shaped perforated fixed electrode arranged in front and at the rear of said pair of developing and squeezing rollers, said plate-shaped perforated fixed electrode being provided with a number of elongate holes arranged with respect to the traveling direction of the record sheet, such that one half of the total number of elongate holes is inclined at an angle with respect to the traveling direction of the record sheet and the other half is inclined in the opposite direction.

4,116,142

WORKPIECE TENSIONING DEVICE FOR A SEWING UNIT

Roberto Sanvito, Milan, Italy, assignor to Rockwell-Rimoldi S.p.A., Milan, Italy

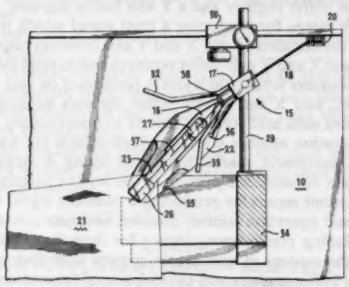
Filed Sep. 29, 1977, Ser. No. 837,680
Claims priority, application Italy, Oct. 29, 1976, 28836 A/76
Int. Cl.[2] D05B *21/00*
U.S. Cl. 112—121.26 **2 Claims**

1. A workpiece tensioning and positioning device for a traveling gripper movable along the work surface of a sewing unit while holding a workpiece being advanced to the stitching instrumentalities of a sewing machine mounted adjacent one end of the work surface, said workpiece tensioning and positioning device comprising:

(a) a cable element interconnecting the traveling gripper with a return device for applying tension to the workpiece while being advanced to the sewing machine and returning the gripper to its starting position upon release of the workpiece therefrom.

(b) a positioning member mounted on the work surface defining the starting position for the traveling gripper which includes;

(i) a pair of divergent tongues having a shock absorber assembled intermediate the inner ends thereof;



(ii) means defining a central opening in said positioning member through which said cable element is caused to travel during movement of the traveling gripper; and

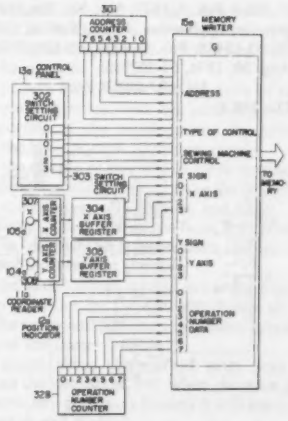
(c) said cable element being attached to the traveling gripper at a location displaced from its longitudinal axis for effecting pivotal movement thereof, upon its return to starting position, to a location in readiness for attachment to a workpiece.

4,116,143

PROGRAMMING SYSTEMS FOR AUTOMATIC SEWING MACHINES

Takao Manabe, Shizuoka, Japan, assignor to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 28, 1977, Ser. No. 782,232
Claims priority, application Japan, Mar. 31, 1976, 51-35524
Int. Cl.[2] D05B *19/00*
U.S. Cl. 112—121.11 **6 Claims**



1. In a programming system for an automatic sewing machine of the type comprising a memory device provided with a plurality of addresses corresponding to respective steps of the sewing operation of said sewing machine, said addresses being used to store sewing machine driving signals corresponding to

respective addresses and means for storing a sewing command program in said memory device, the improvement which comprises:

a sewing pattern sheet provided with marks corresponding to needle lowering positions of a predetermined sewing profile;

a coordinate reader including a stylus movable on said sheet to a selected mark, and an X axis and a Y axis counter for representing the X and Y coordinates respectively of said stylus at said selected mark;

an axis buffer register and a Y axis buffer register;

switch means for producing a reset signal which is used to set the contents of said X and Y axis counters respectively in said X and Y axis buffer registers and to reset said X and Y counters when said stylus is positioned on said selected mark, said X and Y axis buffer registers holding the set values until said stylus is moved to a succeeding mark;

an operation number counter which counts the number of the successive marks positioned along a straight line which constitutes a portion of the sewing pattern profile;

gate circuit means for producing a counting signal supplied to said operation number counter, said gate circuit means including coincidence circuits for detecting coincidence of the content of said X axis counter with that of said X axis buffer register and coincidence of the content of said Y axis counter with that of said Y axis buffer register;

a control panel for producing a signal regarding the type of the sewing machine control and a sewing machine control signal;

an address counter which advances its count in response to a reset signal for said operation number counter, for the signal regarding the type of control and for the sewing machine control signal; and

a memory writer for storing said signal regarding the type of the sewing machine control, said sewing machine control signal, and bit values of said X and Y axis buffer registers and of said operation number counter in a memory region corresponding to an address in said memory device designated by said address counter.

4,116,144
STITCH PATTERN FORMING CONTROL IN A SEWING MACHINE

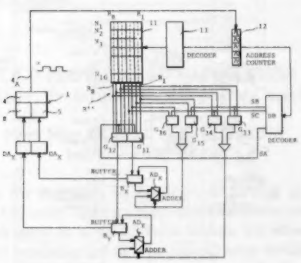
Akira Tanimoto, Kashihara; Yukihiro Yoshida, Ikoma, and Sunao Katoh, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 7, 1977, Ser. No. 766,349

Claims priority, application Japan, Feb. 6, 1976, 51-13483; Feb. 6, 1976, 51-13484; Feb. 9, 1976, 51-13667; May 11, 1976, 51-54009; Aug. 30, 1976, 51-103913

Int. Cl.[2] D05B *3/02*

U.S. Cl. 112—158 E **23 Claims**



1. In an electric sewing machine which forms a stitch pattern in response to an output signal from a control system, the control system comprising:

a static memory for storing digital information related to positional coordinates for each stitch of a predetermined stitch pattern;

an address counter for progressively advancing steps of the static memory for read out purposes;

a dynamic memory for temporarily storing the digital information derived from the static memory;

a synchronization pulse signal generator for developing a synchronization pulse signal in response to stitch forming operation conducted by the sewing machine;

means for progressively reading out the digital information temporarily stored in the dynamic memory in response to the synchronization pulse signal;

modification means for modifying the digital information temporarily stored in the dynamic memory; and

supply means for supplying the digital information read out from the dynamic memory to a stitch forming section of the sewing machine.

4,116,145
UPPER FABRIC FEED DEVICE FOR SEWING MACHINES

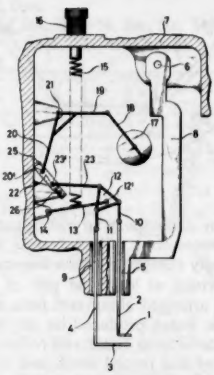
Karl Nicolay, Bielefeld, Germany, assignor to Durkoppwerke GmbH, Bielefeld, Germany

Filed May 3, 1977, Ser. No. 793,415

Claims priority, application Fed. Rep. of Germany, May 7, 1976, 2620209

Int. Cl.[2] D05B *27/04*

U.S. Cl. 112—212 **9 Claims**



1. in a sewing machine a transport mechanism comprising a pressure foot and a feed foot for advancing the material to be sewn, the transport transmission which comprises:

a crank disc for transmitting rotary motive power;

an input crank eccentrically connected to said crank disc;

a bell crank actuated by said input crank, said bell crank comprising:

a receiving arm connected to said input crank,

a swing arm, and

a fixed pivot center for said bell crank disposed between said receiving arm and said swing arm;

a composite connecting link actuated by said swing arm said composite link comprising:

a guide bar having a fixed pivot pin, and

a guided sliding link having two pivot centers in fixed relation near its ends;

an output crank actuated by said composite connecting link;

a ternary link carrying on its base the pressure foot and the feed foot;

a further link attached with one end to a fixed pivot center and with its other end pivotally attached to the pivot center of said ternary link; and

pressure means for maintaining said further link under a predetermined pressure.

4,116,146

SEWING MACHINES

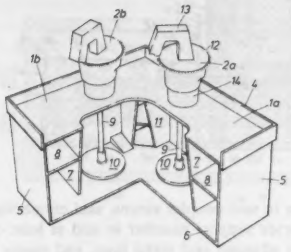
Denis Matthews, Sutton in Ashfield, England, assignor to Mathbirk Limited, Sutton in Ashfield, England

Filed May 11, 1977, Ser. No. 795,924

Claims priority, application United Kingdom, May 19, 1976, 20606/76

Int. Cl.[2] D05B *75/06*

U.S. Cl. 112—217.2 **2 Claims**



1. A work station for the joining together of textile fabrics comprising at least two rotatable sewing machines and a bench having a horizontal work surface on which each of said sewing machines is mounted for rotation about a substantially vertical axis relative to the work surface, said work station characterized by:

(a) an L-shaped horizontal work surface having limbs of substantially equal length, each limb supporting rotatably at least one sewing machine, whereby said work surface together with the sewing machines rotatably mounted thereon are disposed relative to each other so that an operator may be placed in a position to operate each of said sewing machines in turn,

(b) a base spaced below the work surface,

(c) spaced vertical members mounted on the base for supporting the work surface,

(d) partitions interposed between the work surface and the base for defining shelves, cupboards, compartments and the like and

(e) a vertical, rotatable shaft depending from each sewing machine and extending downwardly toward the base, each said shaft having means affixed thereto for imparting rotation to the sewing machine from which the shaft depends.

4,116,147

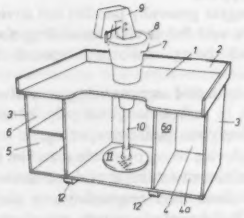
SEWING MACHINES

Denis Matthews, Sutton in Ashfield, England, assignor to Mathbirk Limited, Sutton in Ashfield, England

Filed May 11, 1977, Ser. No. 795,925

Int. Cl.[2] D05B *75/06*

U.S. Cl. 112—217.1 **1 Claim**



1. A work table for a sewing machine, said work table including:

(a) a horizontal work surface and a sewing machine mounted rotatably relative to said work surface,

(b) said work surface having side and rear edge portions defined by a peripheral upstanding edge for containment of work on the work surface and a front edge portion in which is formed an indentation,

(c) a base spaced below the work surface,

(d) spaced vertical members mounted to the base and extending upwardly therefrom to support the horizontal work surface,

(e) a space interposed between the base and the work surface,

(f) at least one shelf and at least one compartment located in the space,

(g) a vertical, rotatable shaft connected to and extending downwardly from the sewing machine into the space to enable rotation of the sewing machine from beneath the work surface and

(h) foot engageable means affixed to the shaft below the work surface for imparting rotation to the shaft and to the sewing machine.

4,116,148

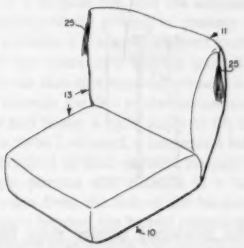
FLOOR-SUPPORTED CUSHION ASSEMBLY AND METHOD OF MAKING SAME

Kay Anne Torrez, 924 E. Washington, Phoeniz, Ariz. 85034

Filed Sep. 26, 1977, Ser. No. 836,737

Int. Cl.[2] D05B *97/00*

U.S. Cl. 112—262 **8 Claims**



1. In the making of a floor-supported cushion assembly, the method comprising the steps of:

(a) folding a piece of fabric having a decorative face and a plain face in half with said decorative faces in engagement and providing a longitudinal fold at one side and free edges at the opposite side;

(b) placing pattern pieces over end portions of said folded fabric in spaced relation, with one pattern piece being for the seat portion of the envelope and the other pattern piece for the back portion of the envelope;

(c) marking the top ply of said folded fabric to designate end seam lines and seam lines spaced from the free edges, each of which extends inwardly from an end edge;

(d) cutting out a rectangular recess from both plies midway between the fold and the opposite seam line and at the end edges of said bottom seat portion;

(e) sewing the seams which extend inwardly from the end edges, leaving a slot for the accommodation of a zipper;

(f) opening the seams and adjusting the folded fabric to move the seams to the center front;

(g) sewing seams along the marked seam lines that are spaced from the end edges, and when the seam at the end of the bottom seat portion is formed it will leave a cut-out corner at each end thereof;

(h) adjusting the corners to bring the free edges thereat into accurate coincidence, and then stitching a seam at a space from and parallel to these edges;

(i) turning the envelope inside-out to bring the decorative face of the fabric into exposed position;

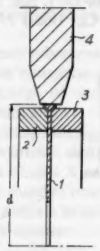
(j) inserting the zipper into the slot and securing in place by stitching;
(k) opening the zipper and inserting a foam pad into the seat end portion, with corners of the pad being snugly received in front corners of the seat end portion;
(l) inserting a pillow into the back end portion of the envelope; and
(m) placing the envelope with the cushion and pillow therein on a flat supporting surface, with the zipper in a downward position and forcing the upper ply of the envelope downwardly against the bottom ply in the space between the end portions and securing them together by sewing to form a hinge.

4,116,149

CENTRIFUGAL BLADE FOR A TURBINE - ROTOR METHOD FOR MAKING THE SAME

Alois Kauf, Unterzeitlbach; Georg Kandler, Unterpfaffenhofen; Axel Rossmann, and Fritz Nustede, both of Karlsfeld, all of Germany, assignors to Motoren- und Turbinen-Union Munchen GmbH, Munich, Germany

Filed Dec. 21, 1976, Ser. No. 753,110
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1975, 2558436
Int. Cl.² B21D *51/00*
U.S. Cl. 113—116 D **13 Claims**



1. A method for producing turbine rotor blades having curved root portions by using sheet stock comprising of steps of: applying to sheet stock an outer rim curvature geometrically similar to a final curvature of the root portions of said blades; curving said sheet stock three-dimensionally; clamping said sheet stock in dies having a circumferential contour corresponding to the final contour of the root portions of said blades but being smaller for forming a seam; rolling said seam under pressure for forming a T-shape having a final rim curvature of the root portions of said blades; and cutting a plurality of blades from said sheet stock.

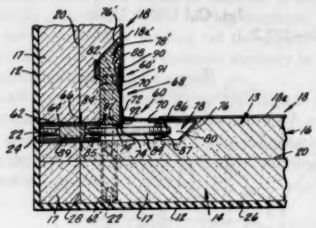
4,116,150

CRYOGENIC INSULATION SYSTEM

Thomas E. McCown, Huntington Beach, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Mar. 9, 1976, Ser. No. 665,285
Int. Cl.² B63B *25/08*; B65D *25/18*
U.S. Cl. 114—74 A **22 Claims**

1. A container for cryogenic liquefied gases which comprises a container wall, at least one fiber reinforced plastic foam insulation layer disposed within said container wall, a low temperature resistant metal liner in contact with the inner side of said at least one foam insulation layer, mechanical fastener means connected to and depending from said metal liner at spaced locations along said liner, retainer means disposed in and connected to said at least one foam insulation layer adjacent said inner side thereof, said retainer means comprising a plurality of strips positioned at spaced locations within said foam insulation layer and secured thereto, said fastener means being engaged in said strips and holding said metal liner in position against said at least one foam insulation layer, said container having corners and including at least one corner structure, said corner structure comprising coupler means positioned in said at least one foam insulation layer, said coupler means comprising an elongated member bonded to said at least one foam insulation layer, and means connecting



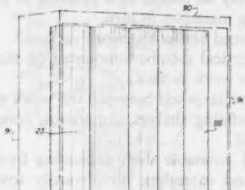
said metal liner to said coupler means, said connecting means including a corner support member in said at least one foam insulation layer adjacent said metal liner, and means connecting said coupler means to the wall of said container, said coupler means transmitting tension loads from said metal liner to the wall of said container.

4,116,151

WIND POWERED APPARATUS

John Guthrie, Suite 1401-555-13th St., West Vancouver, British Columbia, Canada (V7T 2N8)

Filed Aug. 15, 1977, Ser. No. 824,624
Claims priority, application Canada, Sep. 8, 1976, 260709
Int. Cl.² B63H *9/06*
U.S. Cl. 114—102 **8 Claims**

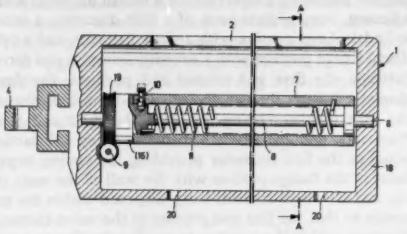


1. A wind-powered apparatus comprising:
an elongate support;
a series of elongate generally parallel foil devices carried on said support, said foil devices extending normally to said support and being uniformly spaced longitudinally thereof;
extension means in said support being operative to move said foil devices in unison longitudinally of said support to vary selectively said uniform spacing;
each said foil device being rotatable about an axis parallel to its length, means maintaining said foil devices in identical orientation about their respective axes and operative to rotate said foil devices in unison selectively to vary said orientation;
and means operative to pivot said support about a vertical axis to position said foil devices in a selected vertical plane.

4,116,152
REEFING APPARATUS FOR A SAILING SHIP

Karl Olof Axel Helmer Larsson, Industriestrasse 40, CH - 6300, Switzerland

Filed Dec. 23, 1976, Ser. No. 753,710
Claims priority, application Sweden, Feb. 19, 1976, 7601980
Int. Cl.[2] B63H 9/04
U.S. Cl. 114—106 6 Claims



1. Reefing apparatus for the sail of a sailing vessel having a sail with a footrope and comprising:

(a) a hollow boom for the sail, said boom having a longitudinal slot therein with a length at least equal to that of the footrope of the sail;

(b) a hollow shaft rotatably mounted within the boom and extending substantially the length of the slot, and to which said footrope is attachable; and

(c) drive means for rotating the shaft in order to roll up the sail on the shaft,

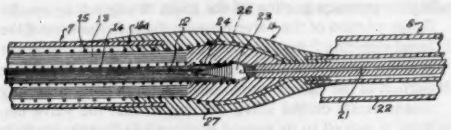
(d) said drive means comprising a helical spring disposed within and connected to said hollow shaft and stressed by unrolling of the sail, said spring subsequently effecting re-rolling of said sail on said shaft, and

(e) manually operable means affording the capability of prestressing said spring prior to unrolling of said sail.

4,116,153
ELASTIC ELECTRICALLY-CONDUCTIVE STRAIN CABLE

Frederick H. Fisher, and Victor C. Anderson, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 4, 1977, Ser. No. 784,020
Int. Cl.[2] B63B 21/56; H01B 7/06
U.S. Cl. 114—244 8 Claims



1. An elastic electrically-conductive strain cable comprising:

an inner member providing an axially-extending core having a circular cross-section of a predetermined diameter,

electrically-conductive wire means helically wound on said inner member throughout its length,

an outer strain member surrounding said inner member and said helical wire means,

said outer strain member being a bundle of fibers disposed in a substantially parallel arrangement and both said inner and outer members also being formed of a elastomeric material selected in accordance with their elastic properties and Poisson ratio characteristics, and

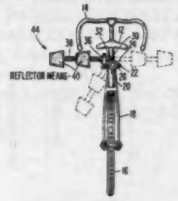
an insulating plastic impregnating the interstices of the fiber bundle for binding the inner and outer members and the helical wire means together into said fixed circular geometry,

said wire means being wound with a particular helical pitch in turns/unit length with the pitch being so related to said inner member diameter and to said Poisson ratio that, when said cable is tensioned, the fractional change in volume per fractional change in length is substantially the same for both said wire means and said elastomeric members.

4,116,154
BICYCLE DISTANCE SAFETY DEVICE

Willie Harris, 1519 - 89th Ave., Oakland, Calif. 94621

Filed Apr. 26, 1976, Ser. No. 679,885
Int. Cl.[2] B60Q 1/34
U.S. Cl. 116—35 A 4 Claims



1. A bicycle distance safety device which indicates not only the presence of a bicycle but also the minimum distance that should be maintained by others in passing the bicycle, the safety device includes a Z-shaped support member that mounts at one end of the frame of a bicycle immediately below the bicycle seat on an seat-elevation-adjustment-bolt, and the support member extends parallel to the horizontal front bar of the bicycle frame and forms a right angle at it's end, a portion of said member is to be L-shaped, a horizontal indicating member is pivotally attached to said parallel support member at said L-shaped angle portion and extends in a lateral outwardly horizontal portion from the side of the bicycle frame a predetermined distance beyond the lateral extension of handlebar of said bicycle, means maintaining said indicating member in said lateral extended position, thus assuring a motorist that by miss hitting said horizontal indicating member the motorist will positively miss hitting the bicyclist, said horizontal indicating member comprises two long-angle arrow-shaped means and reflector material that extends the full length of said horizontal indicating member, whereby manual movement of said indicating member will create an illusion of a moving arrow for better attention getting to prevent an accident, the parallel support member of said safety device also includes the reflector material on both sides and in front to provide three-way protection, the horizontal indicating member and the parallel support member are connected together to form the pivotally movable bicycle distance safety device whereby the safety device provides selective four-way indicating protection for the bicyclist.

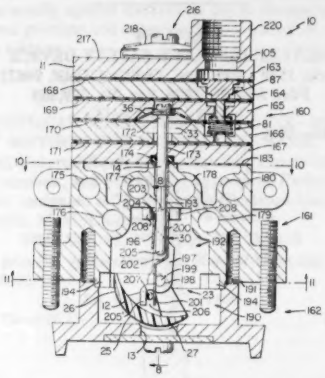
4,116,155
INDICATOR FLAG CONSTRUCTION

Harley V. Bible, Maryville; Clifford E. Goff, and William T. Moon, Jr., both of Knoxville, all of Tenn., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Apr. 25, 1977, Ser. No. 790,406
Int. Cl.[2] G01L 19/08
U.S. Cl. 116—65 14 Claims

1. In an indicator construction having a housing means carrying a movable flag means and a movable plunger operatively associated with said flag means to cause movement thereof upon movement of said plunger by control means carried by said housing means and being operatively interconnected to said plunger, the improvement comprising a spring member having means operatively interconnected to said

plunger and having means operatively interconnected to said movable flag means to cause movement thereof upon movement of said plunger, said flag means being pivotally carried by said housing means, said spring member holding said flag means in one pivoted position thereof by the normal bias of said spring member when said plunger is in one position relative to said housing means, said plunger forcing said spring member out of its normal bias position to another position thereof to hold said flag means in another pivoted position



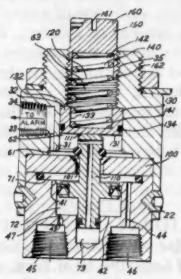
thereof when said plunger is in another position relative to said housing means, said spring member having a leaf portion, said plunger camming against said leaf portion to force said leaf portion to said another position of said spring member and thereby move said flag means to said another position thereof when said plunger is moved to said another position thereof, said leaf portion of said spring member having a step therein, said plunger camming against said step to force said leaf portion to said another position and thereby move said flag means to said another position thereof.

4,116,156

MAINTENANCE ALARM ACTUATOR

Walter E. Draxler, Arlington Heights, Ill., assignor to Arrow Pneumatic, Inc., Forest Park, Ill.

Filed May 25, 1977, Ser. No. 800,252
Int. Cl.[2] G01L *19/12*
U.S. Cl. 116—70 **3 Claims**



1. An improved maintenance alarm actuator adapted for actuating a warning alarm to signal the need to clean or change a fluid filter that is disposed in a fluid flow line and that is subject to clogging as a result to flow through the fluid flow line, the improved maintenance alarm actuator comprising:

a casing including: a main cylindrical cavity having a first diameter and having a first end and a second end; a second cylindrical cavity having a second diameter and being disposed adjacent to and in communication with the first end of the main cavity; and a cylindrical valve seat having a third diameter and being disposed adjacent to and in communication with the first end of the main cavity and with the second cylindrical cavity, with the longitudinal axes of the main cavity, the second cavity and the valve seat being coaxial and with the first diameter being greater than the third diameter;

a balanced valve element comprising: a first cylindrical end portion including a distal end of a fourth diameter and an adjacent, intermediate neck of a fifth diameter; a second cylindrical end portion with a sixth diameter; and a cylindrical flange portion with a seventh diameter and formed between the first and second end portions; the fourth diameter being substantially equal to the third diameter, the fifth diameter being less than the third and fourth diameters, and the seventh diameter being substantially equal to the first diameter providing for sealing engagement of the flange portion with the wall of the main cavity, and the valve element being disposed within the main cavity so that the first end portion of the valve element is disposed within the valve seat, so that the flange portion of the valve element is disposed within the main cavity and so that the valve element is slidable within the main cavity between a first portion wherein the distal end of the first end portion of the valve element is adjacent to the valve seat so as to block flow through the valve seat and a second position wherein the intermediate neck of the first end portion of the valve element is adjacent to the valve seat so as to permit flow through the valve seat;

means for biasing the valve element to its first position including means abutting the distal end of the first end portion of the valve element;

means for permitting communication between the fluid flow line, upstream of the fluid filter, and a higher pressure portion of the main cavity defined by the flange portion of the valve element and the second end of the main cavity so that the pressure of the fluid in the fluid flow line upstream of the fluid filter acts to bias the valve element to it second position;

means for permitting communication between the fluid flow line, downstream of the fluid filter, and a lower pressure portion of the main cavity defined by the flange portion of the valve element and first end of the cavity so that the pressure of the fluid in the fluid flow line downstream of the fluid filter acts to bias the valve element to its first position; and

means, including the valve seat, and the second cavity for permitting communication between the lower pressure portion of the main cavity and the warning alarm when the force resulting from the pressure of the fluid in the higher pressure portion of the main cavity acting on the flange portion of the valve element exceeds the sum of the force resulting from the pressure of the fluid in the lower pressure portion of the main cavity acting on the flange portion of the valve element plus the force that the biasing means exerts on the valve element so that the valve element is moved to its second position and thereby permits flow through the valve seat.

4,116,157

ROTATABLE VISUAL INDICATOR FOR SAFETY SYSTEMS

Willie V. Evans, Kilgore, Tex., assignor to ACF Industries, Incorporated, New York, N.Y.

Filed Nov. 15, 1976, Ser. No. 741,648
Int. Cl.[2] F16K *37/00*; G01L *19/12*
U.S. Cl. 116—125 **4 Claims**

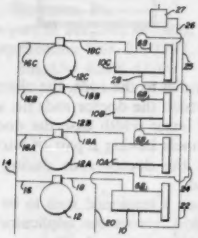
1. A visual indicator structure for indicating a predetermined fluid pressure condition in a fluid system comprising:

a housing having a central bore therein, an elongate slide valve mounted within said bore for longitudinal movement between extended and retracted positions and having a piston adjacent one end thereof in fluid communica-

tion with a sensed fluid in the system, said slide valve being biased to extended position by spring means;

visual indicating means mounted adjacent the other end of the slide valve within the bore for movement between a first indicating position to indicate normal operation and a second indicating position to indicate a predetermined abnormal operating condition in the fluid system being sensed, said visual indicating means including an outer fixed indicator element and a generally flat movable inner indicator element, means mounting the inner indicator element for rotational movement about an axis generally in alignment with the longitudinal axis of the slide valve;

said outer indicator element having a plurality of pie-shaped clear segments, said inner indicator element being divided into alternate pie-shaped segments of one color and into



intervening pie-shaped segments of another contrasting color, said alternate and intervening segments being alternately aligned with the clear segments of the outer indicator element for viewing;

a torsion spring having one end secured to the inner indicator element and the other end secured to the slide valve, and means to effect rotation of the slide valve about its longitudinal axis as it moves longitudinally between extended and retracted positions including a cam groove in the slide valve and a pin received in said groove and fixed to said housing to effect rotation of said slide valve upon longitudinal movement thereof, said slide valve rotating in one direction when moving to an extended position for biasing said torsion spring in one direction and rotating in an opposite direction when moving in an opposite direction for biasing said torsion spring in an opposite direction.

4,116,158

VIBRATING MEMBRANE HORNS

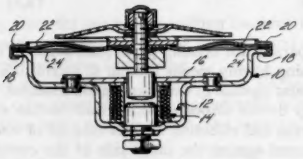
Bertrand Antoine Warnod, Neuilly, France, assignor to Klaxon S.A., Courbevoie, France

Continuation of Ser. No. 721,930, Sep. 15, 1976, abandoned. This application Nov. 17, 1977, Ser. No. 852,381

Claims priority, application France, Sep. 18, 1975, 75 28544

Int. Cl.[2] G10K *9/00*

U.S. Cl. 116—142 R **6 Claims**



1. A vibrating membrane horn of the type comprising a generally cup-shaped case having a peripheral flange extending about an open end of said case, a membrane extending across said open end of said case to close that case, a peripheral portion of said membrane being supported on said flange, a vibration generator disposed in said case and acting on said membrane, a gasket interposed between said membrane and said flange, said gasket being formed of an absorbent material impregnated with a water proofing product, and means clamping the peripheral portion of said membrane and said gasket to said flange, said case, said membrane and said clamping means defining a complete enclosure for said generator to which enclosure, the only access for air and water would be past the edge of said peripheral portion of said membrane, said gasket constituting means admitting air to the interior of the case past said peripheral portion substantially to equalize the pressure in the case with ambient pressure and precluding the ingress of water to the interior of the casing past said peripheral portion.

4,116,159

SUBSTRATE PASSES THROUGH POOL CONFINING WALL COATING APPARATUS

Delmar D. Long, Rock Hill, S.C., assignor to M. Lowenstein & Sons, Inc., New York, N.Y.

Filed Apr. 25, 1977, Ser. No. 790,659

Int. Cl.[2] B05C *3/12*

U.S. Cl. 118—34 **11 Claims**

1. Apparatus for applying viscous coating material to a longitudinally moving porous web to fill the interstices and coat the faces thereof, comprising means for moving an indefinite length porous web in a generally horizontal path of travel, viscous material applicator means comprising a coating head having a pair of elongate manifolds for containing viscous coating material, said manifolds positioned respectively above and below said path of travel to engage the web, each manifold having an elongate sealing opening extending across said web path with said openings positioned in opposed relation to apply viscous coating material onto the opposite face portions of the web as it passes between the manifolds, means for introducing a viscous coating material into the manifolds to coat upper and lower faces of the moving web, and edge means positioned generally centrally in each of said manifolds and extending across said path to contact opposite face portions of the web during its movement between the manifolds and force coating material on the surfaces of the web into the interstices thereof.

4,116,160

FLUIDIZED BED, GAS COATING APPARATUS

John Randolph Langley, Trenton, N.J., and Michael H. Spritzer, San Diego, Calif., assignors to General Atomic Company, San Diego, Calif.

Filed Oct. 26, 1976, Ser. No. 735,186

Int. Cl.[2] C23C *13/00*

U.S. Cl. 118—48 **9 Claims**

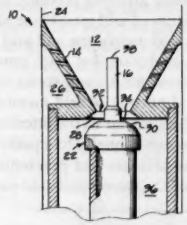
1. Apparatus for coating particles with a substance contained in a reactant gas, comprising

means defining a generally cylindrical coating chamber for containing the particles to be coated,

an inverted conical member having a downwardly extending apex forming a base for said coating chamber and including means for producing a flow of inert gas thereabove in order to form a fluidized bed of the particles above said conical member,

a movable plug forming an apex portion of the inverted conical member, the unloading plug being movable to form an opening for unloading coated particles from said coating chamber, and

an elongated nozzle mounted on said movable plug and extending upwardly from the apex of said conical member



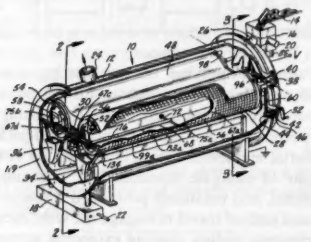
with its outlet being spaced substantially thereabove for introducing reactant gas into said coating chamber.

4,116,161

DUAL TUMBLING BARREL PLATING APPARATUS

Kenneth E. Steube, St. Charles, Mo., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Nov. 12, 1976, Ser. No. 741,307
Int. Cl.[2] C23C *13/08*
U.S. Cl. 118—49.1 **7 Claims**



1. An apparatus for plating articles including:

means forming an enclosed chamber in which the establishment of a desired reduced pressure environment is possible;

support means within said chamber, said support means including a first portion fixedly connected to said chamber forming means, a second portion hingedly connected to said first portion and a pair of elongated inner shields connected to and extending sidewardly from said support means second portion;

a pair of article supporting open mesh barrels of generally cylindrical configuration, said barrels being spaced generally parallel from each other and supported for axial rotation by said inner shields which are positioned therein;

drive means connected to rotate said barrels so that adjacent portions thereof travel upwardly and distant portions thereof travel downwardly; and

means for supplying plating material, said supply means being oriented adjacent the lower adjacent quadrants of said barrels and along a line generally parallel to the axes of said barrels.

4,116,162

COATING DEVICE

Peter Dinter, Hallgarten; Andreas Kolbe, Wiesbaden, and Reinhold Guckes, Hohenstein, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 31, 1977, Ser. No. 829,425
Int. Cl.[2] B05C *1/08, 11/10, 3/18*
U.S. Cl. 118—104 **19 Claims**

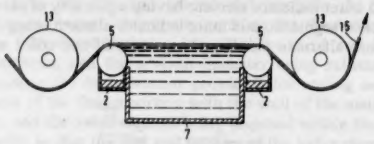
1. Apparatus for continuously applying a flowable coating agent to moving web material of predetermined width comprising:

a coating agent applicator trough extending widthwise across the path of travel of the moving web;

means for supplying coating agent to the trough;

first and second rotatable doctor rods extending parallel to the width of the trough and located along both sides thereof, the doctor rods extending beyond the adjacent sides of the trough so that they form in effect a part of the sidewall of the trough;

support means for the doctor rods comprising channels



extending parallel to the rods, the channels having openings across which the doctor rods lie, said channel openings being of lesser width than the doctor rod diameters and said channels having a pair of narrow edge areas in contact with the doctor rods during operation of the apparatus; and

means for guiding a tensioned web to be coated across the first doctor rod, across the applicator trough and then over the second doctor rod,

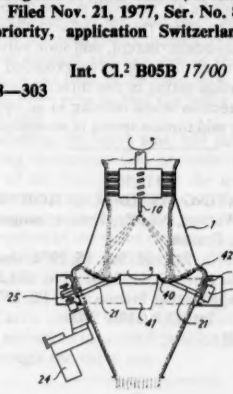
whereby coating material picked up by the web surface facing the trough is wiped to a desired thickness by the second doctor rod in the path of travel of the moving web.

4,116,163

APPARATUS TO COAT A FLOWING MASS OF PARTICULATE MATERIAL

Aldo Torelli, Oberwil, and Erwin Prinz, Adliswil, both of Switzerland, assignors to Peter Fahrni, Kilchberg, Switzerland

Filed Nov. 21, 1977, Ser. No. 853,590
Claims priority, application Switzerland, Nov. 26, 1976, 14905/76
Int. Cl.[2] B05B *17/00*
U.S. Cl. 118—303 **10 Claims**



1. Apparatus for coating particulate material comprising:

a housing having means therein to establish a freely falling annular curtain of said particulate material;

a spray device disposed within said curtain and concentric thereto and effecting at least one jet of coating material directed against the inner side of the curtain whereby a first coating is applied to the particulate material and a remainder portion of the spray passes through the curtain;

a rotatable plate member supported concentrically to the axis of said curtain and disposed so as to intercept said annular curtain after the impringment thereon of said directed spray;

drive means rotating said plate so as to subject the inter-

cepted particulate material to centrifugal forces whereby the intercepted particulate travels radially across the plate and is flung outwardly therefrom;

said housing being configured so as to deflect the outwardly flung particulate material and to guide the deflected material to discharge from said apparatus; and

the directed spray portion passing through the curtain impinges on a portion of said plate lying outside of the curtain path whereby the intercepted particulate material moving radially across the plate due to said centrifugal forces is subjected to an additional coating operation.

4,116,164

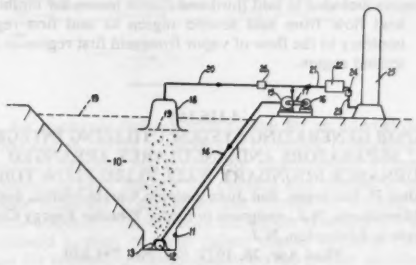
METHOD OF FISH FARMING

Fuad Aboodi Shabi, Chester, and Richard Loxley Hibberd, Sheffield, both of England, assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation-in-part of Ser. No. 687,800, May 19, 1976, abandoned. This application Nov. 21, 1977, Ser. No. 853,376

Int. Cl.[2] A01K *63/00*

U.S. Cl. 119—3 **7 Claims**



1. A method of accelerating the rate of growth of aquatic life such as fish, mollusks and crustacea comprising the steps of:

confining the aquatic life in a body of water wherein the level and oxygen content of the water can be controlled;

introducing a gas containing at least 25% by volume oxygen, balance nitrogen or other gas not harmful to aquatic life below the surface of said body of water allowing said gas to disperse through said body of water; and

maintaining the dissolved oxygen level throughout said entire body of water at least 120% above saturation with respect to ambient air, whereby said aquatic life exhibits a faster rate of growth than in a conventional artificially oxygenated body of water.

4,116,165

MILKING LINER

Bradford Lee Arrington, 5 Hamilton Dr., Petaluma, Calif. 94952

Filed Dec. 13, 1976, Ser. No. 749,734

Int. Cl.[2] A01J *5/04*

U.S. Cl. 119—14.47 **3 Claims**

1. A milking liner for use with a milking machine having a rigid outer casing, said casing having a shouldered enlargement at one end, said liner comprising:

(a) a tube of elastic material having a wall thickness of ¼ inch, said tube adapted to fit longitudinally within said casing, a main body portion of said tube having a uniform diameter,

(b) a first end of said tube having a conically tapered decreased diameter portion, the inner diameter of which tapers from 13/16 inch to 9/16 inch,

(c) a smoothly rounded external bead on the outer end of said first end,

(d) said first end of said tube adapted to be received in the enlarged shoulder portion of the casing when said first end is expanded by the insertion of a rigid ring member therein,

(e) said wall thickness of the first end of said tube decreasing along said tapered portion from an initial thickness of ¼ inch to a final thickness of from 3/32 inch to 1/16 inch.

4,116,166

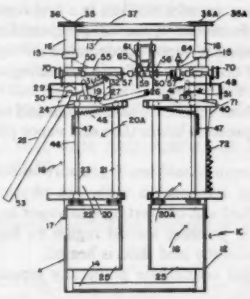
AUTOMATIC CATTLE GATE ASSEMBLY

Armand Gofflot, R.R. #1, Pipestone, Canada

Filed Nov. 8, 1976, Ser. No. 739,492

Int. Cl.[2] A61D *3/00*; **A01K** *1/06*

U.S. Cl. 119—99 **11 Claims**

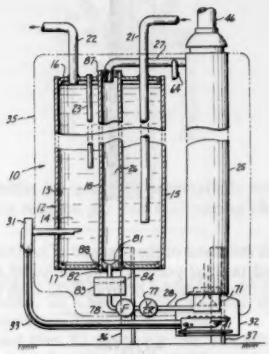


1. In conjunction with an animal chute and the like, a gate assembly situated at one end of the chute and adapted to hold the animal by the neck in position within the chute; said gate assembly comprising in combination supporting structure adjacent said one end of said chute, a pair of neck engaging gates operatively mounted to said supporting structure, at least one of said neck engaging gates being mounted for sideways movement across part of said one end of said chute, means to mount said one gate on said supporting structure for said sideways movement, said last mentioned means including spring means normally urging said one gate from an open position to a closed position, and trigger means situated adjacent said one end of said chute operatively connected to said one gate and normally retaining said one gate in the open position against pressure of said spring means, said trigger means adapted to be engaged by the head of an associated animal in said chute thereby releasing said trigger means whereby said spring means moves said one gate from said open position towards said closed position, means mounting said gates upon said supporting structure for selective partial rotation in either direction relative to said supporting structure for quick release of the associated animal, means normally retaining said gates in a plane substantially at right angles to the longitudinal axis of said chute, and means mounting the other of said gate for selective sideways movement across said chute and positioning said gates in any one of several positions relative to said chute.

4,116,167
METHODS AND APPARATUS FOR HEATING A FLUID BY VAPOR CONDENSATION

Ralph A. Hamilton, 1836 Lake St., Glendale, Calif. 91201

Filed Jan. 24, 1977, Ser. No. 761,839
Int. Cl.[2] F22B *1/02*; F22D *7/00*
U.S. Cl. 122—33 13 Claims



1. A method of heating and storing a fluid, comprising in combination the steps of:
containing said fluid in a space;
heat insulating said space;
providing a vaporizable heat transfer medium;
heating said heat transfer medium in a first region located at a distance from said space to generate from said heat transfer medium a vapor condensable through transfer of heat to said contained fluid and providing a vapor pressure in said first region;
providing by heat transfer to said fluid in said space a second region of a pressure lower than said vapor pressure in said first region;
flowing said vapor to said lower pressure second region into heat transfer relationship with, but physically separate from, said fluid and converting said vapor to a condensate in said lower pressure second region by heat transfer to said fluid whereby said fluid is heated;
maintaining said condensate physically separate from said fluid;
transferring said condensate from said second region to said first region by means of the pressure differential therebetween;
converting said transferred condensate to vapor by reheating in said first region;
continuing to provide by heat transfer to said fluid in said space a lower pressure second region;
recycling said converted vapor from said first region to said second region into heat transfer relationship with, but physically separate from, said fluid and reconverting said vapor to a condensate in said lower pressure second region by heat transfer to said fluid whereby said fluid is further heated;
maintaining said reconverted condensate physically separate from said fluid;
continuing to transfer and recycle condensate from said second region to said first region, to convert recycled condensate to vapor by reheating in said first region, to recycle converted vapor from said first region to said second region, and to reconvert vapor to condensate in said second region, and to reconvert vapor to condensate in said second region by heat transfer to said fluid until said fluid has attained a desired temperature and
inhibiting heat flow from said second region to said first region contrary to the flow of vapor from said first region to said second region.

5. Apparatus for heating and storing a fluid, comprising in combination:
first means for containing and heat insulating said fluid;
second means spaced from said first means for receiving and heating a vaporizable heat transfer medium to generate a vapor in a first region located at a distance from said contained fluid and to provide a vapor pressure in said first region with said vapor;
third means at said first means for providing by heat transfer to said contained fluid a second region of a pressure lower than said vapor pressure in said first region and for maintaining said second region physically separate from, but in heat transfer relationship with, said fluid;
fourth means connected to said second and third means for flowing and recycling vapor from said first first region to said lower pressure second region into heat transfer relationship with, but physically separate from, said fluid and converting said vapor to a condensate in said lower pressure second region by heat transfer to said fluid whereby said fluid is heated;
fifth means connected to said second and third means for recycling condensate from said second region to said first region for reevaporation and
means included in said third and fourth means for inhibiting heat flow from said second region to said first region contrary to the flow of vapor from said first region to said second region.

4,116,168
VAPOR GENERATING SYSTEM UTILIZING INTEGRAL SEPARATORS AND ANGULARLY ARRANGED FURNANCE BOUNDARY WALL FLUID FLOW TUBES

Walter P. Gorzegno, and Juan Antonio Garcia-Mallol, both of Morristown, N.J., assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Apr. 28, 1977, Ser. No. 791,830
Int. Cl.[2] F22B *29/02*; F22D *7/00*
U.S. Cl. 122—406 S 16 Claims

1. A vapor generating system comprising a vapor generating section, a fluid separating section, a superheating section, and fluid flow circuitry connecting said sections in a series flow relationship; said vapor generating section comprising an upright furnace section the boundary walls of which are formed by a plurality of tubes, burner means associated with said furnace section, said tubes being directly exposed to heat from said burner means for the entire height of said boundary walls, said tubes extending vertically in the plane of each boundary wall in the lower portions and upper portions of said furnace section walls and extending at an acute angle with respect to a

horizontal plane in the intermediate portions of said boundary walls extending between said upper and lower portions, and means for simultaneously passing all of said fluid through said tubes to apply said heat to said fluid.

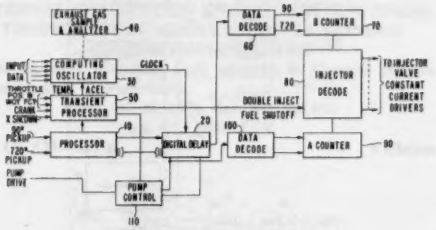
4,116,169
ELECTRONIC CONTROL SYSTEM

David M. Krupp, Mountain View, and Robert B. Hood, Los Altos, both of Calif., assignors to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Continuation of Ser. No. 213,905, Dec. 30, 1971, Pat. No. 3,893,432. This application Dec. 9, 1974, Ser. No. 531,127

Int. Cl.² F02B *3/00*

U.S. Cl. 123—32 EC **9 Claims**



1. An electronic fuel injection system for an internal combustion engine having a plurality of cylinders, comprising an electrically operated fuel injector for each cylinder; a channel connected to each injector for opening and closing it, each channel including a digital divider circuit for holding the injector connected thereto open during the counting of a predetermined number of input pulses; engine operated timing means for impressing voltage pulses on the divider circuits to start said circuits sequentially; a variable frequency fuel pulse generator connected to the inputs of all said divider circuits; and means connected to said pulse generator for controlling its frequency inversely in accordance with the fuel demand, whereby said injectors are actuated for periods proportional to the fuel demand.

4,116,170
ELECTRONIC CLOSED LOOP CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

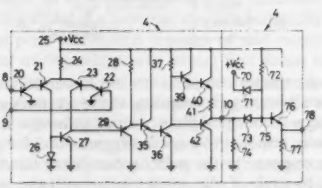
Makoto Anzai, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Aug. 31, 1976, Ser. No. 719,332

Claims priority, application Japan, Sep. 1, 1975, 50-119265[U]

Int. Cl.² F02B *3/00*; F02M *7/00*

U.S. Cl. 123—32 EE **3 Claims**



1. An electronic closed loop control system for controlling an air-fuel ratio of the air-fuel mixture supplied to an internal combustion engine (1), which system includes: and exhaust gas sensor (3) for sensing a component of exhaust gases to generate an electrical signal representative thereof, a differential signal generator (4) fed by a source of single polarity and connected to said exhaust gas sensor for generating an electrical signal representative of a differential value between the signal from the sensor and a reference signal, control means (5) connected to the differential signal generator, and an actuator (6) connected between said control means and the engine, said control means controlling said actuator depending upon said differential value to optimally regulate the air-fuel ratio of the air-fuel mixture,

wherein said electronic closed loop control system further comprises: clamping means (4') for clamping the signal from said differential signal generator to generate a signal therefrom, said clamping means being electrically interposed between said differential signal generator and said control means and including a first d.c. power source the potential of which is lower than that of a second d.c. power source provided for the differential signal generator, the potential of the signal from said clamping means ranging substantially from that of said first d.c. power source and zero potential, and the middle value of the signal from said clamping means substantially corresponding to the case where the potential of the signal from the sensor is equal to that of said reference signal.

4,116,171
COOLING DEVICE FOR AN INTERNAL COMBUSTION ENGINE

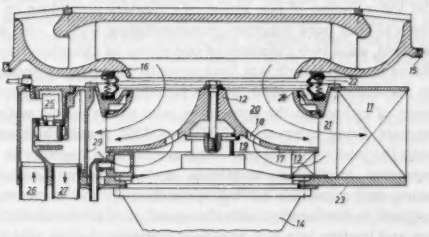
Robert Schulmeister, and Helmut Roth, both of Friedrichshafen, Fed. Rep. of Germany, assignors to Motoren-und Turbinen-Union Friedrichshafen GmbH, Fed. Rep. of Germany

Filed Nov. 10, 1976, Ser. No. 740,669

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1975, 2550481

Int. Cl.² F01P *9/04, 7/02*; F28F *13/08*; F04D *5/00*

U.S. Cl. 123—41.57 **18 Claims**



1. A cooling arrangement for a liquid-cooled internal combustion engine, the arrangement including a first annular cooler means traversed by a flow of cooling air from the inside of said annular cooler means to the outside thereof, a radial-flow fan means having a rotor means arranged within the first annular cooler means for axially drawing in cooling air from an air intake means, a second annular cooler means arranged downstream of said radial-flow fan means, as viewed in the intake flow direction, for cooling of fuel of the internal combustion engine, characterized in that the rotor means includes a rotor inlet means for communicating with the intake openings and a wall member, at least a portion of which is interposed between the rotor inlet means and the second annular cooler means so as to define a rotor side chamber means, and in that means are provided in said rotor means for communicating said rotor side chamber means with said rotor inlet means so as to effect a flow of cooling air through said second annular cooler means.

4,116,172
NATURALLY ASPIRATED EIGHT CYLINDER INTERNAL COMBUSTION ENGINE

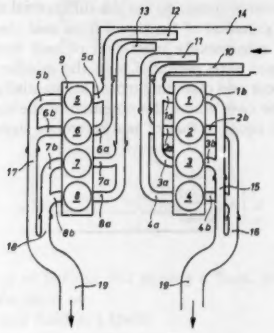
Joachim Löhr, Schwaig; Friedrich Bauer, Mittelhembach, and Kurt Leonhard, Nüremberg, all of Fed. Rep. of Germany, assignors to Maschinenfabrik Augsburg-Nürnberg Aktiengesellschaft, Nüremberg, Fed. Rep. of Germany

Filed Jun. 9, 1976, Ser. No. 694,160

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1975, 2525769

Int. Cl.² F02B *75/18*

U.S. Cl. 123—52 M **4 Claims**



1. A naturally aspirated eight cylinder internal combustion V-engine equalized for mass and bearing loads by more uniformity in firing intervals of the individual cylinders, in which the cylinders of each bank of cylinders are divided into groups of two cylinders each, the first, second, third and fourth cylinders form one cylinder bank and the fifth, sixth, seventh and eighth cylinders form the second cylinder bank, and in which a firing order of he first, fifth, seventh, second, sixth, third, fourth, and eighth cylinder at a firing interval of 90° crank angle is adopted, and which includes in combination: inlet valve means respectively associated with said cylinders, inlet manifolds, the inlet valve means of one group of cylinders pertaining to the same cylinder bank together communicating with a joint inlet manifold, each two cylinders of one group of cylinders having a firing interval which is at least equal to the opening period of the respective inlet valve means pertaining to the respective group of cylinders, the respective inlet valve means with an alternate firing interval of 270° and 450° crank shaft angle being the inlet valve means which are brought together to the respective joint inlet manifolds, and equalizing container means, said manifolds having approximately the same length designed in conformity with the speed of rotation of said engine and leading into said equalizer container means, said inlet manifolds projecting to a different extent into said equalizing container means in order to obtain nearly equal mean lengths of said inlet manifolds.

4,116,173
INTERNAL COMBUSTION ENGINE IGNITION SYSTEM

John A. McDougal, 2801 S. Port Hwy., A-4, Flint, Mich. 48507, and John W. Lennington, 1018 Congress, Ypsilanti, Mich. 48197

Continuation of Ser. No. 572,167, Apr. 28, 1975, abandoned, which is a division of Ser. No. 336,559, Feb. 28, 1973, Pat. No. 3,903,856. This application May 26, 1977, Ser. No. 800,959

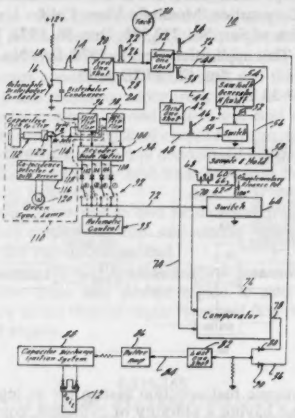
Int. Cl.² F02P *5/04*; F02M *7/00*

U.S. Cl. 123—117 R **35 Claims**

1. For an engine having a wall means defining a predetermined plurality of combustion chambers and ignition means associated with each of said combustion chambers for igniting a charge in each of said combustion chambers at times established at least in accordance with an operating cycle of said engine, a system for controlling said engine comprising:

single detecting means for detecting a parameter relating to the actual combustion of said charge in said combustion chambers and for providing an output signal representative of said parameter for said combustion chambers; and

control means being responsive to said output signal of said single detecting means and including distinguishing means



responsive to said operating cycle of said engine for distinguishing between said parameter relating to the actual combustion of said charge in each respective one of said combustion chambers, said distinguishing means providing a signal indicative of said parameter for each respective one of said combustion chambers, said control means operatively associated with said engine and utilizing said distinguishing means signal for providing a control signal which is effective to control the operation of said engine.

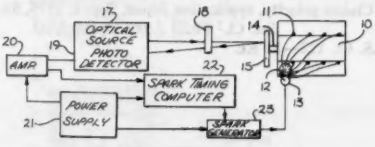
4,116,174
SPARK TIMING COMPUTER

Kenneth J. Schlichting, 13651 N. Mindora Ave., Sylmar, Calif. 91342

Filed Jun. 23, 1976, Ser. No. 699,057

Int. Cl.² F02P *5/04, 5/06*

U.S. Cl. 123—117 R **5 Claims**



1. A spark timing computer for use in combination with a system for advancing or retarding the spark timing of an engine having a set of spark plugs, a spark generator for generating a pulse in response to a spark trigger, a coil for generating a spark in response to the pulse, a distributor for distributing the spark to each of the spark plugs, with the engine also having a crankshaft and a reference angle detecting device coupled to the crankshaft and having a squarewave output, said spark timing computer comprising:

a. resetting means for forming a start pulse and a stop pulse electrically coupled to the reference angle detecting device;

b. an integrator electrically coupled to a voltage reference and reset by either the start pulse or the stop pulse from said resetting means;

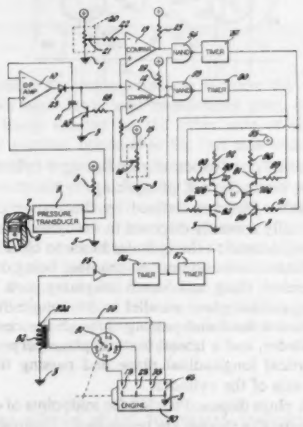
c. peak detecting means for detecting and holding the peak amplitude of said integrator and reset by the start pulse;
d. scaling means for scaling the peak amplitude of said peak detecting means electrically coupled to said peak detecting means;
e. comparing means for comparing the scaled peak amplitude of said peak detecting means with the output of said integrator; and
f. triggering means for forming a spark trigger in response to a signal from said comparing means and for sending the spark trigger to the spark generator.

4,116,175

INTERNAL COMBUSTION ENGINE IGNITION SPARK TIMING SYSTEM MODULATED BY CYLINDER COMBUSTION PRESSURE

Roger D. Sand, Kokomo, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 28, 1976, Ser. No. 709,493
Int. Cl.² F02P 5/04
U.S. Cl. 123—117 R **5 Claims**



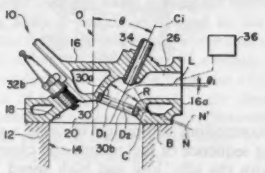
1. An internal combustion engine ignition spark timing system modulated by cylinder combustion pressure for use with internal combustion engines equipped with an ignition system for sequentially firing the engine cylinders including an ignition spark initiating mechanism of the type operable to advance or retard the ignition spark, comprising: means for producing during each power stroke of a selected monitored engine cylinder an electrical peak cylinder combustion pressure indicating signal of a potential magnitude directly proportional to the peak combustion pressure of said monitored engine cylinder during said power stroke; first means including first timer circuit means responsive to each said peak cylinder combustion pressure indicating signal of a potential magnitude less than a first predetermined value for producing an output ignition spark advance signal of a predetermined pulse width; second means including second timer circuit means responsive to each said peak cylinder combustion pressure indicating signal of a potential magnitude greater than a second higher predetermined value for producing an output ignition spark retard signal of a predetermined pulse width; and means responsive to each said ignition spark advance signal for operating said ignition spark initiating mechanism to advance the ignition spark and to each said ignition spark retard signal for operating said ignition spark initiating mechanism to retard the ignition spark.

4,116,176

DUAL SPARK PLUG IGNITION INTERNAL COMBUSTION ENGINE HAVING IMPROVED CYLINDER HEAD CONFIGURATION

Yoshimasa Hayashi, Yokohama, and Yasuo Nakajima, Yokosuka, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Feb. 15, 1977, Ser. No. 768,876
Claims priority, application Japan, Feb. 16, 1976, 51-15703
Int. Cl.² F03M 25/06
U.S. Cl. 123—119 A **8 Claims**



1. An internal combustion engine having a cylinder block in which a cylinder is formed, comprising:
a cylinder head formed with a concavity defining therein a combustion chamber, the surface of the concavity closing one end of the cylinder;
means for supplying a portion of the exhaust gases of the engine into the combustion chamber of the engine;
two spark plugs disposed at said cylinder head and projected into the combustion chamber, said two spark plugs being located such that their electrodes lie generally symmetrical with respect to the center axis of the cylinder;
intake and exhaust valve heads which are respectively seatably disposed on annular intake and exhaust valve seats secured to the surface of the cylinder head concavity, said intake and exhaust valve heads being located such that the centers of said intake and exhaust valve heads are spaced apart from each other in the direction of a longitudinal axis of the cylinder head;
an intake port formed in said cylinder head, said cylindrical intake port being connected at its one end to the combustion chamber through the intake valve seat and opening at its other end to one side of said cylinder head, the center axis of the intake port including a curved portion which is formed with the radius of curvature ranging from 0.73 times to 0.77 times the minimum inner diameter of the annular intake valve seat, the axis of the curved portion being joined at its one end to the center axis of the intake valve seat, and a generally straight portion generally parallel with the bottom surface of said cylinder head and connected to the other end of the curved portion, the cylinder head being secured at the bottom surface thereof to the cylinder block.

4,116,177

PRE-VOLATILIZING ELECTRONICALLY CONTROLLED CARBURETOR

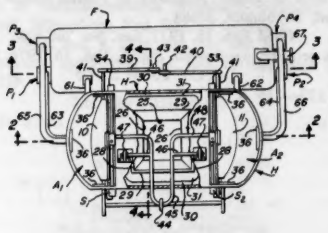
Norman Whatley, Jr., 3505 E. Lake Way, Littleton, Colo. 80121

Filed Jan. 21, 1977, Ser. No. 761,460
Int. Cl.² F02B 31/00; F02M 7/00
U.S. Cl. 123—119 R **24 Claims**

13. A carburetor for an internal combustion engine, comprising:
a fuel and air mixing chamber connected to the intake manifold of said engine;
means for controlling the supply of air to said mixing chamber;
a plurality of separate fuel volatilization chambers at different positions around or along said mixing chamber, each said fuel chamber having an outlet connecting with said mixing chamber;

means for supplying fuel to said fuel volatilization chambers including a series of fuel pumps connected to the respective fuel chambers;

at least one of said chambers having a different size than another of said chambers; and



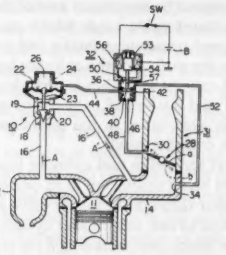
means for controlling said pumps to cause a variation in the operating sequence of fuel pumps and chambers in accordance with the idle, low and high speed modes of said engine.

4,116,178

EXHAUST GAS RECIRCULATION APPARATUS

Haruhiko Saito, Nagoya, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Feb. 2, 1977, Ser. No. 765,068
Claims priority, application Japan, Dec. 10, 1976, 51-148449
Int. Cl.[2] H02M *25/06*
U.S. Cl. 123—119 A **2 Claims**



1. An exhaust gas recirculation apparatus for an internal combustion engine, comprising:

an exhaust system and an intake system connected with said engine, said intake system including an intake passage with a throttle valve mounted therein;

pipe means connecting said exhaust system with said intake system;

a vacuum operated flow control valve arranged on said pipe means and having a vacuum operating chamber which is normally connected to a first vacuum port formed in said intake passage at a position located slightly upstream of said throttle valve when closed in its idle position, said vacuum operated valve being opened by a vacuum signal transmitted to said chamber from said first vacuum port when the throttle valve is, during the operation of the engine, opened from said idle position so that the port is located downstream of said throttle valve, thereby causing a part of the gas from the exhaust system to be recirculated to the intake system via said pipe means; and,

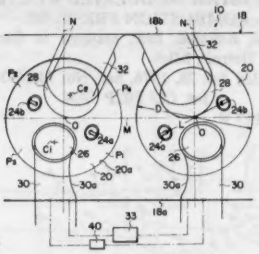
switching valve means for disconnecting the connection of said vacuum operating chamber with said first port, and for connecting said vacuum operating chamber with a second vacuum port formed in said intake passage at a position located downstream of said throttle valve in its idle position when the operation of the engine is stopped, the connection of said vacuum operating chamber with said second vacuum port allowing the opening of said valve in response to a vacuum signal which is formed in the intake system when engine "dieseling" takes place thereby causing the exhaust gas in the exhaust system due to the "dieseling" to be recirculated to the intake system via said pipe means.

4,116,179

DUAL SPARK-IGNITION INTERNAL COMBUSTION ENGINE

Shin-ichi Nagumo; Yoshimasa Hayashi, both of Yokohama, and Kizuku Otsubo, Kokubunji, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Feb. 4, 1977, Ser. No. 765,770
Claims priority, application Japan, Feb. 6, 1976, 51-11912
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **17 Claims**



1. An internal combustion engine having a cylinder formed in a cylinder block thereof, comprising:

a combustion chamber defined by the crown of a piston reciprocally movably disposed in the cylinder and a cylinder head secured to the cylinder block to close one end of the cylinder, said combustion chamber being divided into first, second, third, and fourth imaginary parts by a vertical longitudinal plane parallel to the longitudinal axis of the cylinder head and passing through the center axis of the cylinder, and a lateral vertical plane perpendicular to the vertical longitudinal plane and passing through the center axis of the cylinder;

two spark plugs disposed so that the midpoints of central and side electrodes thereof are respectively located at the first and second imaginary parts of said combustion chamber;

intake and exhaust valve heads disposed so that the centers thereof are respectively located at the third and fourth imaginary parts of said combustion chamber;

means for supplying a portion of the exhaust gases of the engine into said combustion chamber.

4,116,180

INTERNAL COMBUSTION ENGINE WITH IMPROVED EXHAUST VALVE ARRANGEMENT

Yoshimasa Hayashi, and Shin-ichi Nagumo, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

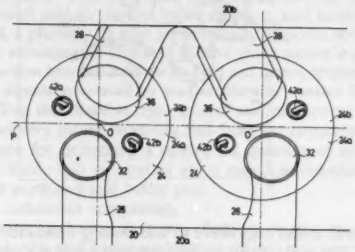
Filed Feb. 4, 1977, Ser. No. 765,771
Claims priority, application Japan, Feb. 6, 1976, 51-11913
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **7 Claims**

3. In an internal combustion engine having a cylinder block forming therein a cylinder in which a piston is reciprocally disposed, a cylinder head secured to the cylinder block to close the one end of the cylinder and form a combustion chamber between a recessed surface portion of the cylinder head and the crown of the piston, said cylinder head being formed with an intake port communicable with the combustion chamber and at least one exhaust port communicable with the combustion chamber, means for recirculating a portion of the exhaust

gases into the combustion chamber, and two spark plugs disposed within the combustion chamber to ignite a charge containing the exhaust gases, the improvement comprising;

an intake valve movably disposed at the circular surface portion of the cylinder head and arranged to block or establish the communication between the combustion chamber and the intake port, said intake valve being located at one side of the recessed surface portion with respect to a vertical longitudinal plane of the cylinder, said longitudinal vertical plane passing through the center axis of the cylinder; and

at least one exhaust valve movably disposed at the recessed surface portion of the cylinder head and arranged to block



or establish the communication between the combustion chamber and the at least one exhaust port, said exhaust valve being located on the other side of the recessed surface portion, opposite to the one side with respect to the vertical longitudinal plane of the cylinder head, the cross-sectional area defined by the outermost periphery of said at least one exhaust valve being 0.19 to 0.24 times the cross-sectional area of the cylinder bore.

5. An internal combustion engine as claimed in claim 3, in which the exhaust gas recirculating means includes means for controlling the amount of the exhaust gases recirculated into the combustion chamber within the range, at maximum, from 20 to 40% by volume of the intake air inducted in the combustion chamber through the intake port.

4,116,181

DUAL SPARK PLUG IGNITION INTERNAL COMBUSTION ENGINE

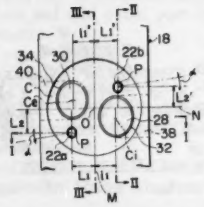
Yasuo Nakajima, Yokosuka, and Yoshimasa Hayashi, Yokohama, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Feb. 14, 1977, Ser. No. 768,700

Claims priority, application Japan, Feb. 16, 1976, 51-15704

Int. Cl.[2] F02M *25/06*

U.S. Cl. 123—119 A **9 Claims**



1. An internal combustion engine including a cylinder block having therein a cylinder in which a piston is reciprocally movably disposed, comprising:

a cylinder head secured at its flat surface to the flat surface of the cylinder block and formed with a concavity, the surface of the concavity closing one end of the cylinder and defining a combustion chamber between the concavity surface and the crown of the piston;

two spark plugs secured to the cylinder head such that the midpoints of the spark plug gaps formed between the center and side electrodes thereof project and lie in the combustion chamber and lie generally opposite to each other with respect to the center axis of the cylinder, the midpoint of the spark plug gap of each spark plug being located at a first predetermined distance from the extension of the flat surface of said cylinder head in the direction of the center axis of the cylinder;

intake and exhaust valve seats embedded in the concavity surface of said cylinder head, said intake valve seat having an annular surface which is exposed to the combustion chamber, the center of said intake valve seat which lies on the extension of the annular surface being located at a second predetermined distance from the extension of the flat surface of said cylinder head in the direction of the cylinder center axis, the second predetermined distance being in the range of from slightly larger to smaller than the first predetermined distance;

intake and exhaust valve heads respectively seatably disposed on said intake and exhaust valve seats, the centers of said intake and exhaust valve heads which lie on the surfaces exposed to the combustion chamber being located generally opposite to each other with respect to the cylinder center axis; and

means for supplying a portion of the exhaust gases of the engine into the combustion chamber.

4,116,182

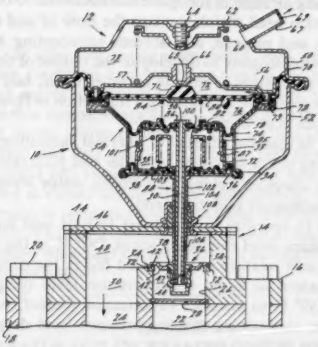
VARIABLE PERCENTAGE EXHAUST GAS RECIRCULATION VALVE

Cyril E. Bradshaw, Kalamazoo, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Jun. 22, 1977, Ser. No. 808,840

Int. Cl.[2] F02M *25/06*

U.S. Cl. 123—119 A **6 Claims**



1. In an exhaust gas recirculation valve assembly for controlling the recirculation of exhaust gases between the exhaust manifold and the inlet manifold of an internal combustion engine, the valve assembly being of the type including a pressure transducer assembly operative to move a recirculation valve in response to the pressure level in a power signal chamber and wherein said pressure transducer assembly includes air bleed valve means for controlling the flow of air from atmosphere to the power signal chamber, an improvement comprising:

a. a moveable valve member carried with said air bleed valve means; and

b. means operative to apply a force to move said air bleed valve moveable member between a position preventing air flow through said air bleed valve and a position permitting

air flow through said air bleed valve in response to changes in engine exhaust back pressure and engine inlet manifold pressure.

4,116,183

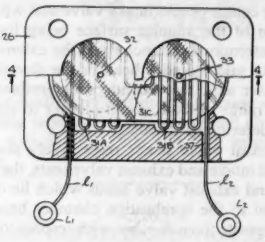
FUEL ATOMIZING UNIT WITH OVEN CHAMBER

Arthur Hayward, Bronx, N.Y., assignor to Electronic Fuel Saver, Inc., Bronx, N.Y.

Continuation-in-part of Ser. No. 587,846, Jun. 18, 1975, Pat. No. 4,020,812. This application May 2, 1977, Ser. No. 792,681

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 F **8 Claims**



1. An atomizing unit interposable in a conduit which feeds a relatively cold mixture of fuel droplets dispersed in an air stream at a varying flow rate to a combustion chamber for ignition therein, said unit acting to effect vaporization of said mixture before it enters said combustion chamber and comprising:

A. a metal plate fabricated of a material which is non-reactive with said mixture and possessing heat sink characteristics, said plate having a flow passage which registers with said conduit, said plate having a cavity therein;

B. a permeable assembly seated in said cavity and constituted by a pair of parallel planar mesh screens having an electrical heating element in the space therebetween to define an atomization zone which restricts the flow of said mixture through said passage, said screens intercepting and dissecting said droplets to develop in the output of the unit a fog-like suspension of minute particles in air, said screens having a mesh size introducing a restriction to flow whose impedance is at least about 15%;

C. a pair of gaskets formed of thermal insulation placed above and below said plate to render said plate effective as an oven chamber having a relatively stable temperature which surrounds said zone; and

D. means to energize said element to heat said zone to a temperature level exceeding about 550° F. in the absence of said cold mixture to cause said fog in the presence of said mixture to attain a temperature level lying above about 150° F. to promote vaporization thereof, said oven chamber maintaining said temperature level despite said variations in flow rate.

4,116,184

APPARATUS FOR TREATING EVAPORATED FUEL GAS

Kazuo Tomita, Shizuoka, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Jan. 5, 1977, Ser. No. 757,013

Claims priority, application Japan, Oct. 4, 1976, 51-119115

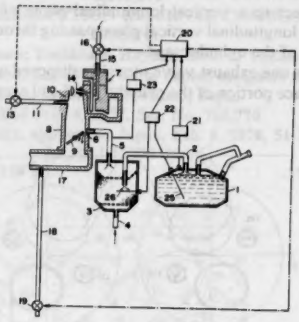
Int. Cl.² F02M *23/12*

U.S. Cl. 123—136 **4 Claims**

1. An apparatus for treating evaporated fuel gas in a motor vehicle having a closed fuel tank vented to an intake portion of an engine in said motor vehicle via a pipe and charcoal canister, said apparatus comprising:

a means for sensing a plurality of parameters indicative of the amount of evaporated fuel gas at a plurality of locations;

a controllable means for increasing the amount of air into said intake portion of said engine through at least one of three passages, an air intake passage of a carburetor, an intake manifold passage and a main air bleed passage of said carburetor; and



a control means responsive to said sensing means for actuating said controllable means such that when the amount of evaporated fuel gas increases at said plurality of locations, the amount of air in said intake portion is increased thereby maintaining a proper air-fuel ratio.

4,116,185

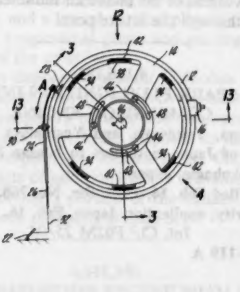
RADIAL CARBURETOR

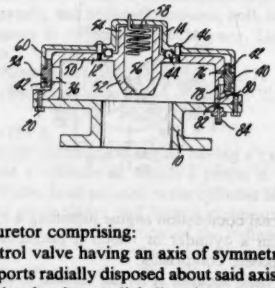
Endre A. Mayer, Birmingham, and Charles R. Kelso, Farmington Hills, both of Mich., assignors to The Bendix Corporation, Southfield, Mich.

Filed Dec. 20, 1976, Ser. No. 752,377

Int. Cl.² F02M *27/08*; F02B *33/00*

U.S. Cl. 123—139 AW **25 Claims**





1. A carburetor comprising:

an air control valve having an axis of symmetry, a plurality of inlet ports radially disposed about said axis admitting air into said valve in a radial direction towards the axis of symmetry, means for controlling the effective open area

of said inlet ports, and an outlet port disposed concentric with said axis; and

fuel delivery means for delivering a controlled quantity of atomized fuel at a location inside said air control valve intermediate said inlet ports and said outlet port and concentric with said axis symmetry.

10. In combination with an internal combustion engine having an intake manifold, a pressurized fuel source, and an accelerator control for providing a signal indicative of an operator's command, an improved carburetor for supplying an air/fuel mixture to the intake manifold comprising:

an air control valve means fixedly attached to said intake manifold for controlling the air flow to the engine, said air control valve having an axis of symmetry, an outlet port concentric with said axis conducting the air flowing through said air control valve means to said intake manifold, a plurality of inlet ports radially disposed about said axis admitting air into said control valve means in a radial direction towards said outlet port and means responsive to the signals generated by said accelerator control for controlling the effective open area of said inlet ports; and

fuel delivery means receiving fuel from the pressurized fuel source for delivering a controlled quantity of atomized fuel inside said air control valve means intermediate said inlet ports and said outlet port.

22. A carburetor comprising:

a housing enclosing an inner chamber having an axis of symmetry, said housing admitting air into said inner chamber in a radial direction towards said axis of symmetry having a plurality of air inlet ports radially disposed through the walls of said housing, an outlet port disposed concentric with said axis of symmetry, at least one valve aperture disposed through the wall of said housing intermediate two adjacent air inlet ports, and at least one valve outlet passageway disposed proximate said valve aperture;

A cage movable from a first position to a second position, attached to said housing and circumscribing said air inlet ports and said at least one valve aperture, said cage having a plurality of shutter members equal in number to said inlet ports, resiliently mounted to said cage, and covering each of said inlet ports when said cage is in said first position and not covering said inlet ports when said cage is in said second position, and at least one valve shutter resiliently mounted to said cage between said cage and said housing over the location of said valve aperture and valve outlet passageway, said valve shutter having a face adjacent to the housing conforming to the contour of housing and an air aperture passing therethrough connecting to the valve outlet passageway for a first predetermined interval of movement of said cage between said first and second positions and wherein said valve shutter further includes a vacuum signal passageway formed along said face connecting said valve aperture with said valve outlet passageway for a second interval of movement of said cage between said first and second positions; and

fuel delivery means for delivering a controlled quantity of atomized fuel inside said housing at a location intermediate said inlet ports and said outlet port concentric with said axis of symmetry.

4,116,186

FUEL INJECTION PUMPING APPARATUS

Moshe Drori, East Twickenham, England, assignor to CAV Limited, Birmingham, England

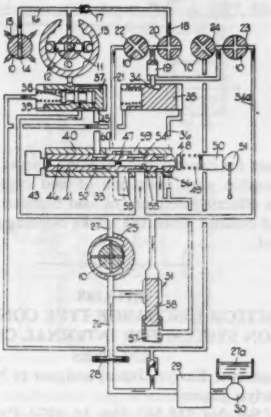
Filed Jun. 20, 1977, Ser. No. 808,131

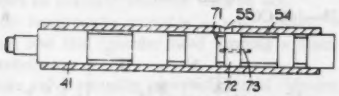
Claims priority, application United Kingdom, Jun. 22, 1976, 25822/76

Int. Cl.² F02D *1/02*

U.S. Cl. 123—139 AM **2 Claims**

1. A fuel injection pumping apparatus for supplying fuel to internal combustion engines and of the kind comprising an injection pump, a feed pump for supplying fuel under pressure to the injection pump, an axially movable member disposed in a surrounding body, an adjustable orifice defined by a groove in the member and a port in the body, the size of said orifice determining the amount of fuel supplied to the engine at each injection stroke by the injection pump, a pivotal centrifugal weight acting on one end of the member and urging the member in an axial direction to reduce the size of said orifice, a governor spring acting to urge the member against the action of said weight, operator adjustable means for varying the force exerted by the spring, a reaction member for the pivot of said weight, resilient means acting to urge the reaction member and pivot in opposition to said governor spring and a dash-pot acting to limit the rate of movement of the reaction member against the action of said resilient means when the force ex-





erted by the governor spring is increased, said weight, spring and orifice constitute a governor to control the speed of the associated engine in accordance with the setting of the operator adjustable means, characterised in that a further groove is provided on the aforesaid member, said further groove being spaced from said first mentioned groove, said further groove being brought into registration with said port when the aforesaid orifice is closed during engine deceleration, said further groove being in restricted communication with said first mentioned groove so that a restricted supply of fuel can be supplied to the engine when said orifice is closed, during conditions of engine deceleration.

4,116,187

APPARATUS FOR INCREASING THE BLEND AND CHARGE OF THE FUEL-AIR MIXTURE FOR AN ENGINE

Randall J. Moore, 916 Engleman Pl., Loveland, Colo. 80537

Filed Aug. 29, 1977, Ser. No. 828,263

Int. Cl.² F02M *29/06*

U.S. Cl. 123—141 **17 Claims**

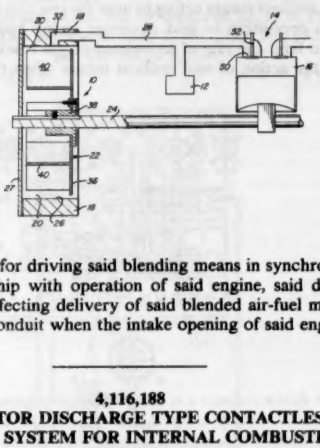
1. In an internal combusion engine system having a carburetor for mixing fuel and air, an intake opening to a cylinder of said engine and a manifold for delivering fuel and air from said carburetor to said intake opening, the improvement comprising:

a housing member of an essentially airtight construction and including a hollow interior chamber;

port means defined in said chamber for receiving and delivering fuel-air mixture;

a conduit coupled between said port means and said manifold for communicating fuel-air mixture between said manifold and said port means;

blending means disposed within said chamber for inducing turbulence into air-fuel mixture drawn through said port means from said conduit and delivering blended air-fuel mixture through said port means to said conduit;



and means for driving said blending means in synchronized relationship with operation of said engine, said driving means effecting delivery of said blended air-fuel mixture to said conduit when the intake opening of said engine is opened.

4,116,188

CAPACITOR DISCHARGE TYPE CONTACTLESS IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

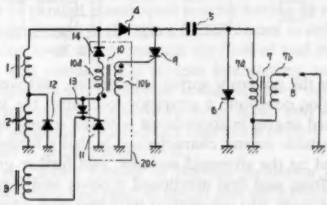
Masao Nagasawa, Kariya, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Division of Ser. No. 515,247, Oct. 16, 1974, Pat. No. 4,014,309. This application Nov. 29, 1976, Ser. No. 745,645

Claims priority, application Japan, Oct. 17, 1973, 48/117120

Int. Cl.[2] F02P 1/00

U.S. Cl. 123—148 CC **6 Claims**



1. A capacitor discharge type contactless ignition system for an internal combustion engine comprising:

a capacitor charging coil mounted on a magneto generator driven by an internal combustion engine for generating alternating current in synchronism with the rotation of said internal combustion engine, said alternating current having positive half waves and negative half waves;

a capacitor connected in series with said capacitor charging coil for storing said positive half waves;

an ignition coil having a primary winding and a secondary winding, said primary winding being connected in series with said capacitor;

a spark plug connected to said secondary winding and mounted in said internal combustion engine;

a switching means having a control gate and connected to said capacitor, said switching means, said capacitor and said primary winding forming a capacitor discharging circuit;

a trigger coil for generating first and second signals in synchronism with said internal combustion engine;

a control circuit connected to said trigger coil, said control gate of said switching means and said capacitor charging coil, said control circuit generating ignition signals in response to said first signals and said negative half waves of said alternating current producing during rotation of said engine in a proper direction, said control circuit also generating reversion protecting signals in response to said second signals and the negative half waves of said alternating current produced during rotation of said engine in an improper direction,

said ignition signals being supplied to said control gate of said switching means to make it conductive, to thereby discharge the stored charge on said capacitor to produce an ignition spark at said spark plug, to thereby keep the rotation of said engine in said proper direction,

said reversion protecting signals being supplied to said control gate of said switching means to discharge the stored charge on said capacitor to produce a spark at a time where the engine is at the position where substantial combustion does not take place, to thereby prevent the reverse rotation from being kept.

4,116,189

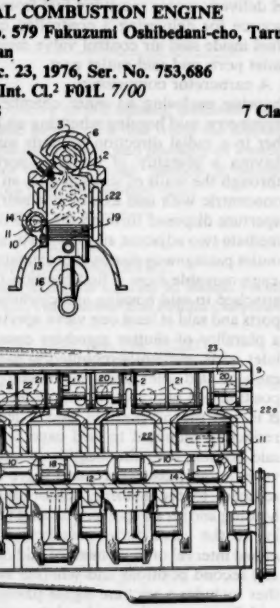
INTERNAL COMBUSTION ENGINE

Ryuzi Asaga, 1-10 No. 579 Fukuzumi Oshibedani-cho, Tarumi-ku, Kobe City, Japan

Filed Dec. 23, 1976, Ser. No. 753,686

Int. Cl.[2] F01L 7/00

U.S. Cl. 123—190 BB **7 Claims**



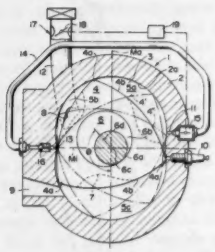
1. In an internal combustion engine having a block with at least one cylinder defined therein a piston reciprocable in the cylinder, a crank shaft connected to said piston and rotated thereby, said engine having intake means connected to said block for supplying air and fuel to said cylinder for ignition therein to form combustion products, and exhaust means connected to said block for venting said combustion products from said cylinder, the improvement comprising, in combination: said block having a valve housing chamber defined therein above said cylinder and connecting with said exhaust means, rotary valve means rotatably mounted in said valve housing chamber, inlet and exhaust passage means defined in said cylinder adjacent said valve housing chamber, said rotary valve means having a valve intake passage and a valve exhaust passage circumferentially spaced from said valve intake passage defined therein, said valve intake passage being communicable between said inlet passage means of said cylinder and the intake means for admitting air and fuel into said cylinder, said

valve exhaust passage being communicable between said exhaust passage means of said cylinder and said valve housing chamber for venting said combustion products from said cylinder, and drive means connected between said crank shaft and said rotary valve means for rotation of said valve means; wherein said inlet and exhaust passage means of the cylinder comprise a single inlet-exhaust passage, said valve intake passage further comprising an intake aperture alignable over said inlet exhaust passage and an intake opening alignable with the intake means, and said valve exhaust passage further comprises an exhaust aperture alignable over said inlet-exhaust passage circumferentially spaced and in the same diametric plane as said intake aperture, and an exhaust opening communicated with said valve housing chamber, said exhaust opening is partially covered by an exhaust cover connected to said rotary valve means for deflecting the combustion products as they leave the cylinder through said inlet-exhaust passage and said exhaust aperture to induce a swirling of the products and enhance the recombustion of unburned fuel in said valve housing chamber.

4,116,190
TROCHOIDAL ROTARY PISTON ENGINE WITH BYPASS OF COMPRESSED MIXTURE TO EXHAUST CHAMBER

Katsuaki Kikura, Japan; Hiroshi Nomura, Takehara, and Kiyohiro Takeda, Hiroshima, all of Japan, assignors to Toyo Kogyo Co. Ltd., Hiroshima

Filed Dec. 27, 1976, Ser. No. 754,550
Claims priority, application Japan, Dec. 27, 1975, 51-157864; Feb. 24, 1976, 51-19708
Int. Cl.² F02B *53/00, 55/14*
U.S. Cl. 123—202 **13 Claims**

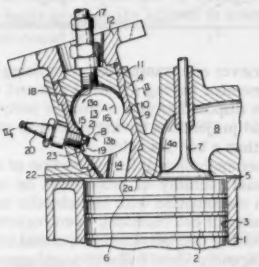


1. Rotary piston engine comprising a casing which includes a rotor housing having an inner wall of trochoidal configuration and a pair of side housings secured to the opposite sides of the rotor housing to define a rotor cavity of trochoidal configuration having a major and a minor axis, and a substantially polygonal rotor disposed in the rotor cavity for rotation with apex portions in sliding contact with the inner wall of the rotor housing to define, between the inner wall of the rotor housing and flanks of the rotor, working chambers which are displaced along the inner wall of the rotor housing as the rotor rotates with volumes varying in response to the rotation of the rotor through intake, compression, expansion and exhaust strokes, intake port means provided in said casing to open to one of the working chambers which is in the intake stroke, exhaust port means provided in said casing to open to another working chamber which is in the exhaust stroke, ignition means provided in the casing for igniting compressed air-fuel mixture, mixture take-out port means provided in said casing to open to the working chamber which is at the end of the compression stroke wherein the working chamber possesses the minimum volume, mixture discharge port means provided in said casing to open to the working chamber which is in the exhaust stroke, said mixture take-out port means being located at a side of the minor axis of the trochoid opposite to the rotor rotation to draw a part of the compressed mixture in the working chamber in the compression stroke and being connected with said mixture discharge port means.

4,116,191
INTERNAL COMBUSTION ENGINE WITH AN AUXILIARY CHAMBER

Hiromichi Yanagihara, and Nobuo Habu, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed May 20, 1977, Ser. No. 799,097
Claims priority, application Japan, Apr. 6, 1977, 52-42020[U]
Int. Cl.² F02B *19/08, 17/00*
U.S. Cl. 123—30 D **4 Claims**



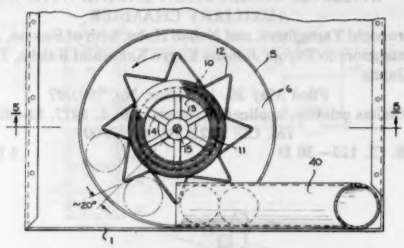
1. An internal combustion engine comprising:
a cylinder block having a cylinder bore therein;
a cylinder head having a cavity therein and mounted on said cylinder block, said cavity having an inner wall which defines an auxiliary chamber with an axis;
a piston reciprocally movable in said cylinder bore, said piston and said cylinder head forming a main chamber therebetween;
an intake valve movably mounted on said cylinder head for leading gas into said main chamber;
an exhaust valve movably mounted on said cylinder head for discharging exhaust gas into the atmosphere;
an annular raised portion formed on the inner wall of said auxiliary chamber around the axis of said auxiliary chamber and forming a recess on the inner wall of said auxiliary chamber beneath said annular raised portion, said annular raised portion dividing said auxiliary chamber into a first chamber and a second chamber which are arranged in tandem along the axis of said auxiliary chamber;
a connecting passage communicating said auxiliary chamber with said main chamber and arranged to be tangentially connected to the inner wall of said second auxiliary chamber for forming a strong swirl motion in said first auxiliary chamber, said recess having a recess portion at a position opposite to the inner wall to which said connecting passage is tangentially connected with respect to the axis of said auxiliary chamber;
a fuel injector having an injecting nozzle disposed in said auxiliary chamber and directed to said recess portion for forming a rich air-fuel mixture therein;
a spark plug having a spark gap located in said recess portion for igniting the rich air-fuel mixture formed in said recess portion, and;
a connecting hole communicating said recess portion with said main chamber and arranged to be tangentially connected to the inner wall of said recess portion for strengthening a swirl motion in said recess portion, which is caused by the strong swirl motion created in said first chamber.

4,116,192

TENNIS BALL RETRIEVER

Jack C. Scott, 8547 Amestoy Ave., Northridge, Calif. 91324

Filed Apr. 28, 1977, Ser. No. 791,970
Int. Cl.[2] A63B *69/38*
U.S. Cl. 124—51 R **16 Claims**



1. A ball retriever and transporter comprising:

a pinwheel member having a central axis and a plurality of projections disposed around a circular periphery thereof, each of said projections having a vertical extent substantially less than a ball diameter;

a wall member encircling at least a portion of said pinwheel member, said plurality of projections on said pinwheel member in combination with said circular member defining a plurality of ball receiving open regions;

means for rotating said pinwheel about said central axis;

means for disposing loose balls into said open regions between said wall member and said projections;

a hollow tube member having a first end disposed through said wall member adjacent said pinwheel and said wall member so that said first end is aligned with the movement of balls around said wall and having a second end thereof disposed adjacent a final destination point, said tube member having an open region at a side thereof adjacent said pinwheel member so as to allow passage of said projections thereby;

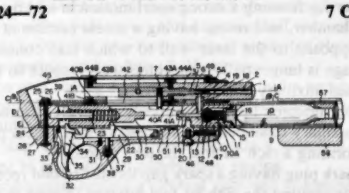
whereby said balls disposed in said open regions in said wall are engaged by said pinwheel and constrained to roll around at least a portion of the interior of said wall in contact with said wall member and said pinwheel, and then into the hollow tube member for forcible transport through said tube member.

4,116,193

PRESSURIZED GAS OR AIR OPERATED REPEATER RIFLE

Kensuke Chiba, Tokyo, Japan, assignor to Sharp Rifle Company, Ltd., Japan

Filed Dec. 2, 1976, Ser. No. 746,722
Claims priority, application Japan, Dec. 27, 1975, 50-157064
Int. Cl.[2] F41B *11/02, 11/06*
U.S. Cl. 124—72 **7 Claims**



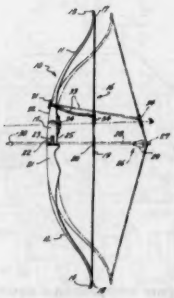
1. A pressurized gas or air operated repeater rifle having a barrel provided with a bolt which is slidable within a bore therein, a cylinder positioned in parallel with the axial line of the barrel, a hammer chamber within said cylinder, and a mechanical seat supporting the barrel and cylinder, said repeater rifle being capable of storing pressurized gas in the cylinder for firing pellets, characterized by a magazine having at least one chamber that can be loaded or unloaded on the side of the barrel, pellets housed in the magazine chamber being normally yieldingly urged towards an opening of the magazine by means of a spring; said bolt having a bolt nock that projects into said hammer chamber at the lower portion of the barrel, a carrier positioned so as to extend through said bore at horizontal right angle to said bolt, said carrier being slidable in said barrel, said carrier also being in freely sliding contact with said magazine opening at horizontal right angle to the direction of said magazine chamber, said carrier being provided with a lateral through hole at such position adapted to match the opening of said magazine when said carrier shifts to the magazine side to admit one pellet from the magazine chamber, and also adapted to match the bore when it shifts in the direction opposite to the magazine side, so that the bolt that has moved forward passes through said hole to load forward a pellet housed in it, an operation bar that connects said bolt with an operation bar handle mounted for freely sliding movement on said cylinder; and movement means for causing reciprocating movement of said carrier by reciprocating movement of said operation bar, said movement means positioned between said bolt and said hammer chamber allowing movement of a pellet from the magazine through the carrier to said bore upon one reciprocating motion of the operation bar.

4,116,194

PEEP SIGHT FOR ARCHERY BOW

Kenneth D. Topel, Puyallup, Wash., assignor to Fine-Line, Inc., Puyallup, Wash.

Filed Oct. 18, 1976, Ser. No. 733,229
Int. Cl.[2] F41B *5/00*
U.S. Cl. 124—87 **11 Claims**



1. An improved peep sight comprising: a body having a sighting bore means extending therethrough, said body including means for mounting said body on a bow string so that said bore means is substantially horizontal when a bow string is in a drawn position and is angled with respect to a longitudinal extension of a bow string when a bow string is in a relaxed or uncocked position; and, an elastic cord means for attaching said body to a bow, said elastic cord means having first and second end means, said first end means being secured to said body and said second end means being adapted to be secured to an archery bow.

4,116,195

DEVICE FOR DISPENSING MEDICAMENTS

Michael James, Welwyn Garden City, England, assignor to Allen & Hanburys Limited, London, England

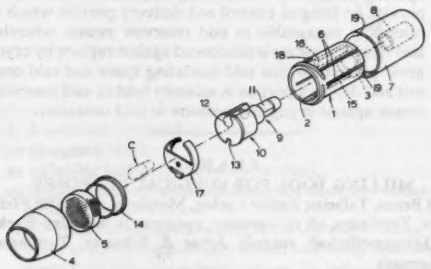
Filed Feb. 10, 1977, Ser. No. 767,518
Claims priority, application United Kingdom, Feb. 10, 1976, 5098/76
Int. Cl.[2] A61M *15/00*
U.S. Cl. 128—266 **7 Claims**

1. An inhalation device for self-administration to a patient

powdered medicaments contained in a capsule, the said device comprising:

(a) a housing defining a chamber adapted to receive a capsule containing a powdered medicament, said housing having a nozzle communicating with the interior of the chamber through which air from said chamber can be inhaled and air inlet means defining apertures formed in said housing for causing air to flow through said apertures said chamber and through said nozzle and thereby, causing said capsule to be agitated;

(b) a magazine slidably mounted in said chamber and longitudinally slidable to and from an operative position, said magazine being also rotatable about a longitudinal axis in said chamber, and having therein a longitudinal capsule loading passage and at least one other longitudinal capsule loading passage circumferentially spaced from said capsule loading passage, said passages being eccentric equidistantly to said axis means for sliding and rotating said magazine in said chamber;



(c) means including a capsule piercing needle and a capsule ejecting member circumferentially spaced from said needle and mounted to said housing and so arranged and positioned inside said chamber that said passages can be registered simultaneously one with said needle and the other with said ejector member or vice versa, on rotation of said magazine and so that movement of said magazine to said operative position will cause a capsule in one of said passages registered with said needle to engage said needle and be pierced by it or will cause a capsule in one of said passages registered with said ejector member to be engaged by said member thereby to displace the capsule from said passage into said chamber so that the powdered medicament from the pierced capsule can be aspirated through said nozzle by the inhalation of the patient; and

(d) means for preventing the capsule leaving said chamber when the patient inhales through said nozzle.

4,116,196

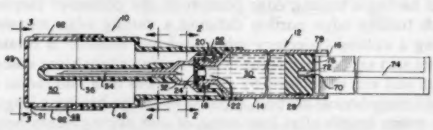
ADDITIVE ADAPTER

Sheldon Kaplan, Potomac, Md.; Edward M. Curley, Washington, D.C., and Gerlof Homan, Olivette, Mo., assignors to Survival Technology, Inc., Bethesda, Md.

Filed Mar. 17, 1977, Ser. No. 778,727

Int. Cl.[2] A61J *1/00*

U.S. Cl. 128—272.3 **12 Claims**



1. An additive adapter for use in conjunction with an injector wherein the injector includes a cylindrical body having a rearward open end and a forward end necked inwardly to form an annular lip, said forward end having a central opening of reduced diameter, sealing means closing off the central opening, a plunger sealingly and slidably fitted in the rearward portion of the body to form a medicament chamber between the sealing means and the plunger, a needle hub affixed to the annular lip, a needle carried by the hub whereby its inner end will be in fluid communication with the medicament chamber upon the opening of the sealing means, the additive adapter comprising:

a main body portion, said main body portion including a cylindrical sleeve open at its forward end and rearward end and a circular skirt portion extending from the rearward end of the cylindrical sleeve, said skirt being sized to snugly engage and fit over the cylindrical portion of the injector's cylindrical body immediately rearward of the necked portion,

a cylindrical shield extending from the forward end of the cylindrical sleeve, and

a retaining assembly extending inwardly from the main body portion to engage the annular lip of the necked end of the injector body to retain the adapter in assembled condition on the aforesaid body.

4,116,197

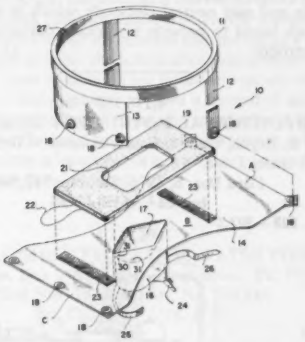
DISPOSABLE FEMALE-BODY-WORN URINAL

Winifred Bermingham, 171 E. 77th St., New York, N.Y. 10021

Filed Aug. 30, 1977, Ser. No. 828,986

Int. Cl.[2] A61F *5/44*

U.S. Cl. 128—286 **10 Claims**



1. A female urinary collection device comprising, a waist belt having a plurality of depending support elements with upper portions integral with the waist belt, an elongated flexible sheet of waterproof material having front, rear and center sections, the front and rear sections in detachable engagement with a lower portion of the support elements, the center section of the sheet having a width substantially less than that of the front section and the rear section, the center section of the sheet further having a depending substantially elongated pouch integral therewith, an opening in the center section in fluid communication with the interior of the pouch, a liquid absorbing pad associated with the flexible sheet and having an opening in the center thereof maintained in positional relationship with the opening in the flexible sheet, mutual engaging means on the absorbing pad and the flexible sheet for releasably maintaining the pad in association with the sheet, and a valve at the base of the pouch, in fluid communication with the interior of the pouch.

4,116,198
ELECTRO - SURGICAL DEVICE

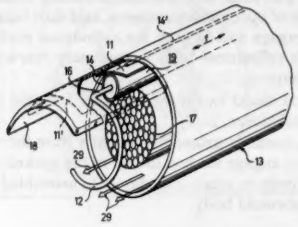
Eberhard Roos, Tuttlingen, Fed. Rep. of Germany, assignor to DELMA, elektro und medizinische Apparatebaugesellschaft m.b.H., Tuttlingen, Fed. Rep. of Germany

Filed May 14, 1976, Ser. No. 686,600

Claims priority, application Fed. Rep. of Germany, May 15, 1975, 2521719

Int. Cl.[2] A61B *17/32*

U.S. Cl. 128—303.15 **20 Claims**



1. In combination: an endoscope having an endoscope body of substantially tubular shape, and an electro-surgical device comprising a treatment electrode projecting at one end from said endoscope body and a neutral electrode arranged adjacent said treatment electrode, insulated cable means for connecting said treatment electrode to one pole of a high-frequency generator, and means for connecting said neutral electrode to the other pole of a high-frequency generator, said endoscope body having an-insulating projection extending over a portion of the periphery of said endoscope body at said one end and having a front edge, said neutral electrode being located within said endoscope body and spaced a distinct distance inwardly from said front edge, a space being formed between said treatment electrode and said neutral electrode which is adapted to be filled with liquid to provide electrical conductance between said electrodes.

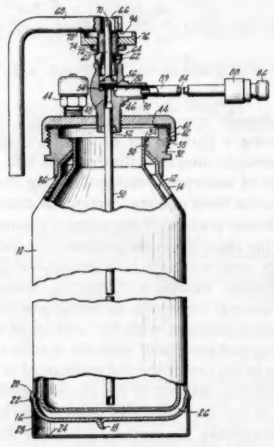
4,116,199
CRYOSURGICAL INSTRUMENT RESERVOIR

Michael D. Bryne, Vernon, Conn., assignor to Brymill Corporation, Vernon, Conn.

Filed Dec. 6, 1976, Ser. No. 747,904

Int. Cl.[2] A61B *17/36*

U.S. Cl. 128—303.1 **3 Claims**



2. A cryosurgical instrument having application means for cryosurgical extraction of heat from living tissue in the treatment thereof, a reservoir means comprising a metal vacuum bottle having an inner wall structure with a mouth forming a container for holding liquid gas cryogen and an outer wall structure separated from said inner wall structure except at a peripheral metallurgical joint between said outer and inner wall structures, said wall structures thereby confining an insulating space between them, said space being at least partially evacuated, and operator-controlled means for conveying the cryogen from said reservoir means to said application means, in which the improvement comprises:

a heavy metal collar metallurgical joined to said outer wall structure near the mouth of said inner wall structure so as to encompass said peripheral metallurgical joint, said collar having a thickness several times thicker than said wall structures, said collar having external threads machined into the periphery thereof; and

a cap having internal threads therein for engagement with the threads of said collar, said application means and said operator controlled means being disposed on said cap to provide an integral control and delivery portion which is releasably engageable to said reservoir means, whereby said reservoir means is reinforced against rupture by cryogenic pressure within said insulating space and said control and delivery portion is securely held to said reservoir means against cryogenic pressure in said container.

4,116,200
MILLING TOOL FOR SURGICAL PURPOSES

Karl Braun, Talheim; Rainer Lacher, Muhlheim, and Willi Pfeiffer, Tuttlingen, all of Germany, assignors to Aesculap-Werke Aktiengesellschaft vormals Jetter & Scheerer, Tuttlingen, Germany

Filed Oct. 1, 1976, Ser. No. 728,728

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1975, 2543723

Int. Cl.[2] A61B *17/32*

U.S. Cl. 128—305 **10 Claims**

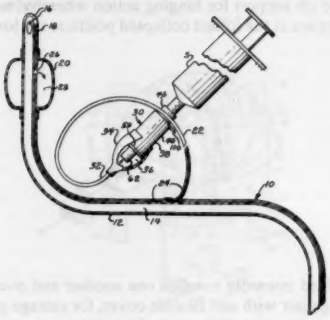
1. A surgical milling tool for milling a member of a joint having a substantially spherical shape, said tool being adapted to be connected to a hand-operated milling machine and comprising a cup member having a milling surface, at least a portion of said milling surface being hemispherical, said hemispherical portion being defined by a radius and an equatorial plane, said cup member being rotatable about an axis perpendicular to the equatorial plane, said hemispherical portion having a plurality of openings therethrough, each of said openings having a trailing edge portion on the perimeter thereof, each trailing edge portion defining a cutting edge movable along a cutting trajectory when said cup member is rotated about said axis, at least some of said cutting edges being spaced from said axis of rotation by a distance less than said radius of said hemispherical portion, each cutting edge having a length, the entire length of at least some of said cutting edges being substantially equi-spaced a radial distance from a hemispherical surface of said cup member, said openings being distributed over said hemispherical portion in relation to one another such that the cutting trajectories of said at least some cutting edges define a hemisphere.

4,116,201

CATHETER WITH INFLATION CONTROL DEVICE

Nayan S. Shah, Carpentersville, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Dec. 20, 1976, Ser. No. 752,761
Int. Cl.[2] A61M 25/00
U.S. Cl. 128—351 17 Claims



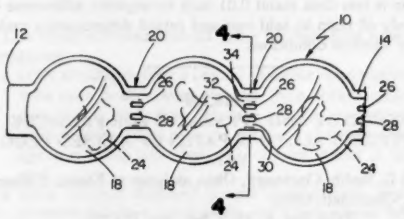
1. A catheter, comprising:
an elongated shaft;
an inflatable balloon secured to the shaft;
an inflation lumen extending along the shaft and communicating with the balloon;
valve means communicating with the inflation lumen, said valve means being normally closed and being openable to pump fluid into the inflation lumen for inflating said balloon; and
vent means communicating with the inflation lumen, said vent means being normally closed and only opening in response to closure of the valve means and a pressure in the balloon above a predetermined amount, said vent means relieving pressure in the balloon above said predetermined amount after inflation of the balloon; and
means for increasing the effective pressure at which the vent means opens responsive to opening of the valve means and preventing actuation of the vent means while the valve means is open.

4,116,202

TEETHER WITH PRESSURIZED FLUID

Richard L. Panicci, Hanover, Mass., assignor to Kiddie Products, Inc., Avon, Mass.

Filed Jun. 22, 1977, Ser. No. 809,108
Int. Cl.[2] A61J 17/00
U.S. Cl. 128—359 5 Claims



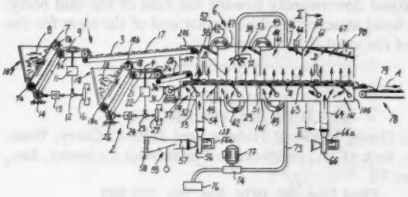
1. A teether comprising two separate sheets of organic thermoplastic material sealed together along their edges and defining a plurality of separate cells connected together by narrow necks between said cells, fluid underpressure within said cells, and fluid flow paths defined by said necks communicating said fluid between adjacent cells, the improvement in which said sheets are connected together at said necks by at least one seal between and spaced inwardly from said edges to define multiple fluid flow paths at each said necks.

4,116,203

METHOD AND APPARATUS FOR BLENDING TOBACCO

Waldemar Wochnowski, Hamburg-Meiendorf, Fed. Rep. of Germany, assignor to Hauni-Werke Körber & Co. KG., Fed. Rep. of Germany

Filed Aug. 5, 1976, Ser. No. 711,704
Claims priority, application Fed. Rep. of Germany, Nov. 9, 1975, 2540411
Int. Cl.[2] A24B 3/08; B01F 11/00, 13/02
U.S. Cl. 131—138 24 Claims



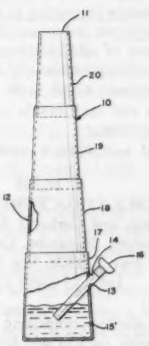
12. Apparatus for blending fibrous materials, particularly tobacco, comprising a conveyor including an elongated foraminous support and means for vibrating said support; means for admitting different types of fibrous material onto one end of said support whereby the vibrating support advances the material in a direction toward the other end thereof wherein said different types having differing densities; means for conveying ascending streamlets of a fluid medium at a predetermined speed through said foraminous support and across the material on said support so that the material is converted into a fluidized bed of substantially constant height wherein the constituents of said different types of fibrous material rise and fall as a result of vibration as well as under the action of said streamlets whereby said different types of material are intimately mixed with each other wherein a homogeneous mixture is formed of said different types; and means for reducing the speed of said fluid medium above the fluidized bed to a second speed at which the ascending medium is incapable of entraining appreciable quantities of material from said bed.

4,116,204

COLLAPSIBLE TELESCOPIC WATER PIPE

James E. Kline, Box 1455-R.D. 4, Linglestown, Pa. 17112

Filed Nov. 15, 1976, Ser. No. 741,514
Int. Cl.[2] A24F 1/14, 1/30
U.S. Cl. 131—173 5 Claims



1. A pipe for consumption of tobacco and other smokable

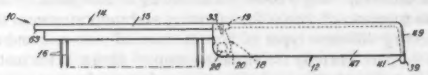
substances comprising: (1) a collapsible, telescopic body in the shape of a truncated cone, closed at its base and open at its narrow end to form a mouth piece, the sidewall of the body having a first carburetor hole and a second stem hole, said telescopic body comprising a series of truncated cone sections, each having a bottom portion having outside bottom edge diameter greater than the inside top lip diameter of the next succeeding larger lower cone so that the sections may be extended and held by the pressure of the top lip of a lower section against the bottom edge of an upper section; (2) a stem inserted into the body through the second hole said second hole being beveled downwardly from the outside to the inside of the said collapsible body and said stem having an outside diameter approximating the inner diameter of said second hole to fit firmly within said second hole at a plurality of positions and to extend downwardly toward the base of the said body; and (3) a bowl attached to the exterior end of the stem for the holding of the smokable substance.

4,116,205

FOLDABLE HAIR BRUSH

Ronald C. Owen, Harwood Heights, and John C. Curry, Westchester, both of Ill., assignors to Plastisonics Company, Inc., Chicago, Ill.

Filed Dec. 20, 1976, Ser. No. 752,592
Int. Cl.[2] A45D *44/18*
U.S. Cl. 132—85 **10 Claims**



1. A hair brush comprising:

a hollow elongated handle portion having an elongated opening therein;

a brush portion hingedly connected to said handle;

bristle means extending from said brush portion;

one of said portions having radially inwardly extending flange means and the other one of said portions having a bi-furcated end for receiving said flange means;

a pin socket connected to one of said bi-furcated ends and said flange means;

hinge pin means connected at the other one of said bi-furcated ends and the distal end of said flange means for engaging hingedly said socket to connect said brush portion to said handle portion so that the brush can be moved to its closed position to enable said bristle means to be moved through said elongated opening into the hollow interior of said handle portion for storage purposes; and

a pair of oppositely disposed open position detent members on the side faces of one of said bi-furcated ends and said flange means spaced outwardly from said pin means by a substantial distance projecting in a direction parallel to the axis of said hinge pin and means defining a pair of grooves at the other one of said bi-furcated ends and said flange means for receiving releasably said detent members to hold releasably said brush in its open position with said brush portion and said handle portion in a substantially coplanar relationship.

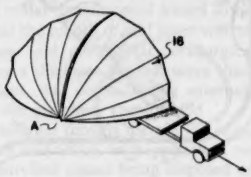
4,116,206

PORTABLE STRUCTURES SR SERIES

Kurt Ehrich Warner, and Gerhardt Allan Warner, both of 97 Canora St., Winnipeg, Manitoba, Canada

Filed Nov. 5, 1976, Ser. No. 739,124
Int. Cl.[2] A45F *1/16*
U.S. Cl. 135—4 R **8 Claims**

1. A collapsible shelter comprising in combination two sets of arched rib supports, each of said supports including a pair of lower ends, means to mount said lower ends of each set on an individual substantially common axis for pivotal action of said arched rib supports from a collapsed folded position to an open erected position and vice-versa, a flexible cover secured to and extending over said rib supports, and a flexible substantially triangular gore extending between the adjacent inner ends of the flexible cover, each of said rib supports comprising at least two sections one each extending upwardly from one of said lower ends and being pivotally secured together at the apex of said arched rib support for hinging action whereby, when said rib supports are in the folded collapsed position, the lower ends



may be folded inwardly towards one another and overlap one another together with said flexible cover, for storage purposes, said means to mount said lower end portions on a substantially common axis including a mounting channel and an end plate pivoted adjacent each end of said channel, transverse bolt means extending through said end plates and through the lower end portions of said rib supports whereby said rib supports are pivotally mounted upon said bolt means and fastening means for said bolt means.

4,116,207

SOLAR PANEL WITH MAT BASE MEMBER

Ramon Dominguez, Rockville, Md., assignor to Solarex Corporation, Rockville, Md.

Filed Jul. 12, 1977, Ser. No. 814,923
Int. Cl.[2] H01L *31/04*
U.S. Cl. 136—89 H **8 Claims**

1. A solar panel which maintains solar energy cells in position to receive light impinging thereon, comprising a base member having an upwardly facing surface with respect to the source of light, a body of cured silicone resin adhesively adhered to said upwardly facing surface, and photovoltaic cells disposed within and encapsulated by said body of resin so that said cells are maintained by said panel in position to receive light impinging on surfaces thereof and convert such light into electrical energy while being protected from ambient conditions by said body of resin, wherein said base member is formed from an, insulating, glass mat polyester that is resistant to warpage at temperatures of about 150° to 200° C. said upwardly facing surface of said base member being formed with alternating peaks and valleys in which the peak-to-valley dimension is less than about 0.01 inch to improve adherence of said body of resin to said mat and retard delamination under adverse ambient conditions.

4,116,208

METHOD OF AND APPARATUS FOR PRESSURE BUFFERING ALL LEAK PATHS OF A LINED PLUG VALVE

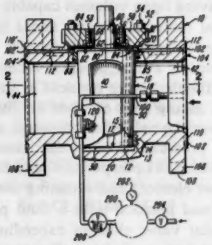
Russell G. Smith, Cincinnati, Ohio, assignor to Xomox Corporation, Cincinnati, Ohio

Filed Jan. 6, 1977, Ser. No. 757,355
Int. Cl.[2] F16K *5/16*
U.S. Cl. 137—1 **17 Claims**

1. The improvement which confines any leakage to externally applied pressurized buffering media rather than line media in a rotary plug valve of the type which includes a body portion having inlet and outlet ports, a plug rotatably mounted in the body and having a through-port defined therein for fluidly connecting the inlet and outlet ports to permit flow of

line media through the valve, means for rotating the plug to selectively fluidly connect and isolate the inlet and outlet ports, upper and lower chambers defined in the body portion adjacent opposite ends of the plug, and means fluidly connecting the upper and lower chambers for establishing a condition of fluid equilibrium therein, the improvement comprising:

means for introducing pressurized buffering media to said chambers;



means for introducing pressurized buffering media into the through-port of the plug when the inlet and outlet ports of the valve body are fluidly isolated from each other by said plug so that when said inlet and outlet ports are in fluid communication via the through-port of the plug the pressurized buffering media in said through-port is exhausted into the line media; and

means for connecting each of the aforesaid means to an external source of buffering media at a pressure above the pressure of the line media.

4,116,209

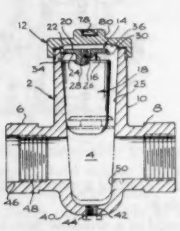
SHOCK ACTUATED SHUT-OFF VALVE

Charles W. Greer, 303 N. Swall Dr., Beverly Hills, Calif. 90210

Filed May 5, 1977, Ser. No. 794,264

Int. Cl.[2] F16K *17/36*

U.S. Cl. 137—38 **18 Claims**



1. A shock actuated shut-off valve for fluid flow lines which comprises:

a valve housing having a central chamber in communication with (a) a hollow inlet conduit, (b) a hollow outlet conduit, and (c) a hollow stowage arm in upward, substantially plumb communication with said chamber, said stowage arm being provided with closure means at its outer end;

a valve element disposed in said stowage arm, said valve element having a valve body and a valve head interconnected by a valve neck, with the valve head being distal to the central chamber;

valve element support means secured to the inner wall of said stowage arm, with the valve head of said valve element being in engagement with and releasably supported by said support means; and

said valve element being in spaced relationship to the inner wall of said stowage arm to provide valve element clearance between said support means and said wall whereby lateral dislodgement of the valve head from the support means effects transition of the valve element through the stowage arm to the central chamber with the valve body sealingly engaging said chamber with respect to at least one of said inlet and outlet conduits.

4,116,210

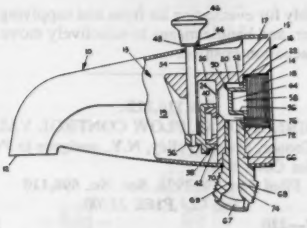
DIVERTER SPOUT ASSEMBLY

Merritt J. Nelson, Sparta, Mich., assignor to Zin-Plas Corporation, Comstock Park, Mich.

Filed Sep. 10, 1976, Ser. No. 722,145

Int. Cl.[2] F16K *1/00*

U.S. Cl. 137—119 **12 Claims**



1. In a diverter spout assembly having a spout with a discharge opening; a passageway within the spout for passing water from a water supply pipe to the discharge opening; a diverter conduit transversely connected to the passageway; a valve operably mounted within the passageway to alternatively open and close the passageway so as to alternatively direct water through the discharge opening or diverter conduit; the improvement comprising:

means within the passageway having open ends, a downstream end and upstream end, and channelling surfaces substantially aligned with the flow of water from the water supply pipe, circumscribing the water flow therethrough and positioned over the diverter conduit for channelling all the water over and past the diverter conduit, the downstream end of the channelling means so positioned to minimize water leakage and siphon effects through the diverter conduit;

means for mounting the channelling means within the passageway such that the channelling surface of the channelling means is substantially horizontal, vertically aligned over the diverter conduit, and spaced apart from the inlet end of the diverter conduit so as to form an open passage from the front open end of the channelling means to the inlet end of the diverter conduit; and the front edge of the channelling surface is directly aligned over the front edge of the diverter conduit.

4,116,211

VALVE ASSEMBLY

James L. Richardson, St. Paul, Minn., assignor to VEDA, Inc., Long Lake, Minn.

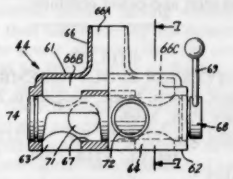
Division of Ser. No. 500,133, Aug. 23, 1974, Pat. No. 4,061,273. This application Mar. 9, 1977, Ser. No. 775,739

Int. Cl.[2] F16K *11/085*

U.S. Cl. 137—205 **20 Claims**

1. A valve assembly for controlling the flow of air moved by a pump means to and from a chamber in a tank, said valve assembly being mounted on the pump means operable to selectively connect the pump means to the tank chamber in an air evacuation condition or an air supply condition, said valve assembly comprising: a housing having a bore, at least three first ports in the housing open to the bore, said first ports being in communication with the pump means and the tank chamber, and at least two second ports open to the bore and the atmosphere, a movable spool located in said bore for controlling the

flow of air through the valve assembly, said spool having a plurality of cavities orientated relative to the first and second ports to provide passages for movement of air through the



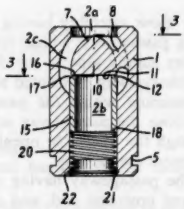
valve assembly for evacuating air from and supplying air to the tank chamber, and handle means to selectively move the spool to an air evacuation position.

4,116,212

UNIDIRECTIONAL FLOW CONTROL VALVE

Roydon B. Cooper, Locust Valley, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

Filed Jun. 14, 1976, Ser. No. 696,110
Int. Cl.[2] F16K *21/00*
U.S. Cl. 137—220 **10 Claims**



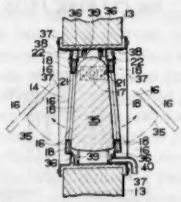
1. A unidirectional flow control valve capable when closed of shutting off flow through a fluid line in one direction, and when open of accommodating the full flow of fluid through the fluid line in the other direction at uniform velocity and a high flow rate with negligible pressure drop, comprising, in combination, a valve housing; an internal wall of the housing defining a valve fluid flow passage of fixed dimensions extending therethrough, having aligned coaxial straight end portions interconnected by an enlarged coaxial bulbous outwardly curved intermediate portion; a fixed valve member having an end surface defining a valve seat, the remainder of the valve member having a smoothly contoured and substantially tear drop shape, the valve seat receiving one end of a tubular valve element and having a substantially flat and smooth surface for fluid-tight sealing therewith, the valve member being disposed coaxially and concentrically in the enlarged portion of the fluid flow passage, and attached to the valve housing at the side of the enlarged portion of the fluid flow passage in a manner to permit fluid flow therepast and defining an outwardly curved valve fluid flow passage as an annulus of fixed dimensions about its outer periphery; the outer periphery of the valve member being shaped to define an annular passage substantially free from sharp bends and changes in direction; a tubular valve element that is light in weight reciprocably disposed coaxially and concentrically in one end portion of the flow passage adjacent the annular passage and movable quickly along the internal wall of the housing in either direction between a closed position in which it extends across the annular passage and an open position in which it is nested against the side walls of the end portion of the fluid flow passage and movable only between fully open and fully closed positions, into and away from engagement with the valve seat; having an open central passage through which when the tubular valve element is in the open position must pass fluid flowing through the valve flow passage in the valve housing; the tubular valve element when in sealing engagement with the valve seat extending across the line of flow between its central portion and the annular portion of the passage, and closing the valve passage at the annular portion thereof, and when away from sealing engagement with the valve seat adopting a nonflow-obstructing position abutting the side walls of the end portion of the flow passage that is concentric and coaxial to the end portion of the fluid flow passage and opening the valve passage for fluid flow through the open center of the tubular valve element; the central passage of the tubular valve element, the annular fluid flow passage and the end portions of the fluid flow passage having open volumes capable of accommodating full fluid flow at uniform velocity and a high flow rate with negligible pressure drop, when the tubular valve element is in a fully open position; a fluid pressure-receiving surface on the surface on the tubular valve element at the end that engages the valve seat, facing and exposed to fluid pressure in the annular portion of the valve fluid passage, and tending under a sufficient fluid pressure to move the tubular valve element from the closed into an open position; and bias means acting on the tubular valve element and retaining the tubular valve element in the closed position until a fluid pressure differential across the tubular valve element exceeding a predetermined minimum is reached, and then allowing the tubular valve element to move against the biasing force of the bias means immediately from the closed into a fully open position allowing full flow of fluid through the fluid line to pass through the valve.

4,116,213

AIR PRESSURE CONTROL APPARATUS FOR A HOT OR COLD STORAGE CHAMBER

Masaaki Kamezaki, Tokyo, Japan, assignor to Taisei Kosan Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 24, 1976, Ser. No. 717,346
Claims priority, application Japan, Dec. 3, 1975, 50-144182
Int. Cl.[2] F16K *17/18*
U.S. Cl. 137—360 **8 Claims**



1. An air pressure control apparatus for a hot or cold storage chamber comprising:

a damper disposed in a window provided in a panel or wall of said storage chamber defining an air passage around a periphery of said damper for ventilating air within said storage chamber therethrough;

said damper being pivotally supported within said window by connecting members projecting inwardly from upper sides of said window and disposed at upper right and left opposite sides thereof enabling said damper to be swingable both inwardly and outwardly in response to variation of air pressure within said chamber;

first and second pivotable frames for airtightly closing said air passage extending thereover and contacting with peripheral surfaces of said window and said damper at inside and outside walls of said storage chamber; and

wherein said frames have openings at central portions thereof through which said damper is exposed to the inside and outside of said storage chamber and are moveable together with said damper, whereby said damper and one of said frames may be shifted either in the inside or outside direction of said chamber releasing the airtight sealing of said air passage in accordance with the variation

of air pressure within said chamber to establish air pressure equilibrium between the inside and outside of said chamber.

4,116,214

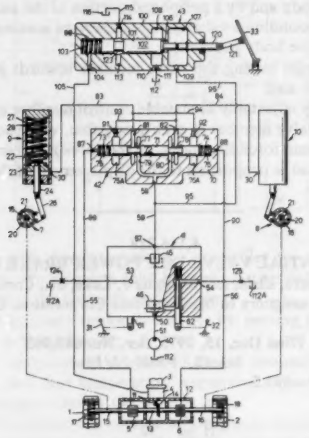
STEERING CLUTCH AND SINGLE PEDAL BRAKE CONTROL SYSTEM FOR CRAWLER TRACTOR

George Paul Koch, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Division of Ser. No. 640,753, Dec. 15, 1975, Pat. No. 4,042,052. This application Mar. 31, 1977, Ser. No. 783,203

Int. Cl.[2] F16K *15/18*

U.S. Cl. 137—522 **6 Claims**



1. In a hydraulic control valve:

a housing;

a first chamber being connectable to receive fluid from a source of pressurized fluid whose pressure is to be controlled and having a discharge outlet;

a second chamber being connectable to a source of pilot fluid;

a valve spool in said housing and movable between one position wherein it closes said discharge outlet of said first chamber thereby maintaining fluid in said first chamber at a predetermined pressure level and another position wherein it opens said discharge outlet thereby causing the fluid in said first chamber to fall below said predetermined pressure level;

biasing means in said second chamber for acting in conjunction with said pilot fluid in said second chamber to bias said valve spool toward said one position;

said biasing means being of insufficient force in the absence of pilot fluid of a predetermined pressure level to maintain said valve spool in said one position; and

actuator means extending into said first chamber and in coaxial arrangement with said valve spool for selectively moving said valve spool toward said other position, said actuator means being releasably engageable with said valve spool so that said valve spool can be moved independently of said actuator means.

4,116,215

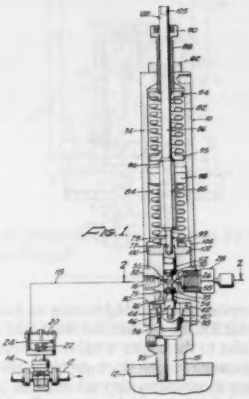
AUTOMATIC RESET PILOT VALVE

John D. Muchow, Cerritos, Calif., assignor to Willis Oil Tool Co., Long Beach, Calif.

Continuation of Ser. No. 617,386, Sep. 29, 1975, abandoned. This application Feb. 28, 1977, Ser. No. 772,906

Int. Cl.[2] F16K *11/10*

U.S. Cl. 137—596.18 **6 Claims**



1. A single pilot valve mechanism to control the transmission of control fluid from a pressurized source to a control cylinder of a spring-loaded shut-off valve in a pipeline in response to changes in the pipeline pressure, said pilot valve having in combination:

a valve body having a bore therein and four ports communicating with said bore, namely, a supply port for connection with the source of control fluid, a cylinder port for communication with the control cylinder of a shut-off valve, an exhaust port, and a sensing port for communication with the pipeline downstream from the shut-off valve;

a first valve member movable along said bore and responsive to changes in the pressure at the sensing port and having a normal position when the pressure in the pipeline is in a predetermined normal range;

first spring means effective to move the first valve member in one direction in said bore out of its normal position to a first alternate position in response to drop of pressure in the pipeline below said normal range;

second spring means effective to enable movement of the first valve member in the other direction in said bore out of its normal position to a second alternate position in response to rise in the pipeline pressure above said normal range;

a second valve member for controlling flow through said supply port;

said first valve member at its normal position being operable to actuate said second valve member to open position and placing said supply port in communication with the cylinder port to supply control fluid to the control cylinder of the shut-off valve to open the shut-off valve, and simultaneously cutting off the supply port from the exhaust port,

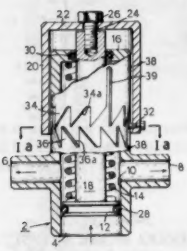
said first valve member at each of its two alternate positions being operable to permit movement of said second valve member to closed position cutting off the supply port from the cylinder port, and simultaneously placing the cylinder port in communication with the exhaust port to vent the control cylinder of the shut-off valve to cause the shut-off valve to close,

said first valve member at each ot its two alternate positions being free to return automatically to its normal position in response to return of the pipeline pressure to the normal range.

4,116,216
REMOTELY ACTUATED VALVES AND FLUID DISTRIBUTION SYSTEM INCLUDING SAME

Peretz Rosenberg, Moshav Beit Shearim, Israel

Filed Aug. 11, 1976, Ser. No. 713,616
Claims priority, application Israel, Jul. 1, 1976, 49947
Int. Cl.[2] A01G *25/02*
U.S. Cl. 137—624.13 4 Claims

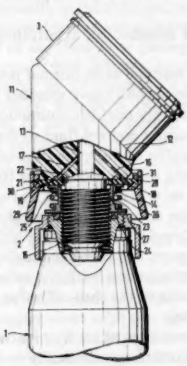


1. A valve comprising: a housing having an inlet for pressurized fluid, an outlet for the pressurized fluid, and a passageway connecting the inlet to the outlet; a valve member reciprocatable within said passageway to open or close the valve; and a steppable counting mechanism stepped with each new application of pressurized fluid to said inlet and effective to reciprocate said valve member to open or close said passageway after the counting mechanism has been stepped a predetermined number of times, said steppable counting mechanism comprising a pair of nestable cup-shaped members including an inner cup-shaped member fixed to and closing one end of the housing and an outer cup-shaped member rotatably coupled to the valve member so that the outer cup-shaped member is reciprocated with the valve member but is rotatable with respect thereto, and cooperable indexing elements carried by said inner and outer cup-shaped members to rotate the outer cup-shaped member one step around the inner cup-shaped member and around the valve member with each reciprocation of the valve member.

4,116,217
DEFLATION VALVE FOR BLOOD PRESSURE MEASURING DEVICES

Blasius Speidel, Hochmeisterstrasse 33, 7455 Jungingen, Fed. Rep. of Germany

Filed Dec. 17, 1976, Ser. No. 751,717
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1975, 2558058
Int. Cl.[2] A61B *5/02;* F16K *11/02*
U.S. Cl. 137—625.12 17 Claims



1. A manually operable deflation valve for the adjustable slow release of air from a pressurized air system and for the selective quick deflation of said system, which is particularly suited for use in conjunction with a blood pressure measuring device, for example, the valve comprising in combination:

a valve body enclosing a cavity in communication with said pressurized air system and defining a valve axis;

a valve seat arranged on the outside of the valve body, on a surface area of the latter which faces outwardly in a substantially axial direction and surrounds an axial protrusion of the valve body;

at least one outlet port to the atmosphere arranged within the surface area of the valve seat, and at least one connecting channel leading from the valve body cavity to said outlet port;

a valve member mounted on the valve body so as to cooperate with its valve seat in such a way that, in its normal position, it covers and closes said outlet port, or ports, to the atmosphere, the valve member being forcibly removable from said normal position into a position in which air can flow through said outlet port, or ports, respectively;

means for guiding and positioning the valve member in relation to the valve body, said means being defined by the valve body and by a peripheral portion of the valve member surrounding a valve member aperture accommodating said valve body protrusion;

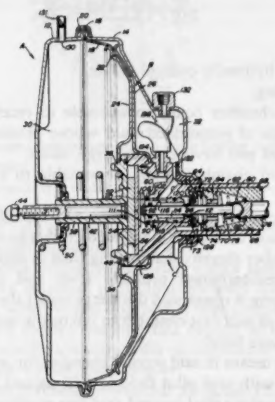
spring means biasing the valve member towards its normal position; and

a manually adjustably actuatable control member connected to the valve member in such a way that, when actuated, it effects said forcible removal of the valve member from the valve seat in proportion to the displacement of the control member.

4,116,218
SEQUENTIAL VALVE FOR POWER BRAKE UNIT

Sydney R. Acre, Elsie, and Marquis J. Lake, Sr., Corunna, both of Mich., assignors to Midland-Ross Corporation, Cleveland, Ohio

Filed Dec. 15, 1975, Ser. No. 640,902
Int. Cl.[2] F16K *11/16*
U.S. Cl. 137—627.5 4 Claims



1. A valve mechanism including valve means having relatively movable cooperating valve member means and valve seat means, passage means in said valve means for connecting a chamber to three different pressure sources of three different magnitudes, operating means movable in one direction for operating said valve member means and valve seat means to sequentially connect the chamber to the three different pressure sources through said passage means in order of increasing magnitude while closing off each preceding pressure source

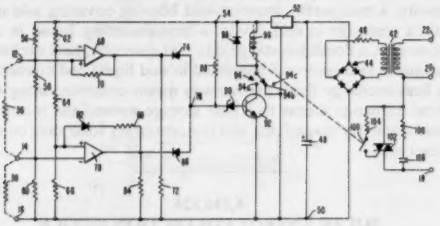
substantially simultaneously with opening of each succeeding pressure source, said operating means being movable in an opposite direction for operating said valve member means and valve seat means to sequentially connect the chamber to the three different pressure sources through said passage means in reverse order of decreasing magnitude, said valve member means including, first, second and third movable valve members, said passage means including a passage through said third valve member, and communication with the chamber past said first and second valve members being through said passage in said third valve member.

4,116,219

DIFFERENTIAL THERMOSTATIC CONTROLLER FOR SOLAR HEATING SYSTEM

Richard K. Nurnberg, Norristown, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Apr. 22, 1976, Ser. No. 679,286
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **11 Claims**



1. In a solar heating system, a controller for energizing a pump motor to circulate fluid between a solar collector and a storage tank, the controller comprising:

first temperature responsive means for sensing the temperature in the collector;

second temperature responsive means connected in series with said first temperature responsive means for sensing the temperature in the storage tank;

switching means for energizing the pump motor;

first comparator means including an operational amplifier having one input connected between the first and second temperature responsive means and also including voltage dividing means connected to another input of the operational amplifier to create a fixed voltage thereat; and

second comparator means for responding to the total temperature sensed by both the first and second temperature responsive means to inhibit the switching means to prevent energization of the motor.

4,116,220

SOLAR ENERGY COLLECTOR

David Miller Burd, 1841 R St. NW., Washington, D.C. 20009

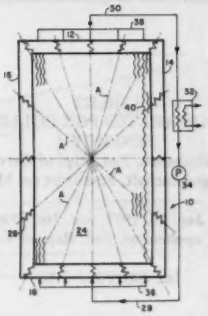
Filed Apr. 27, 1976, Ser. No. 680,708
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **9 Claims**

1. A solar energy collector comprising:

front, back and peripheral insulating walls defining a sealed enclosure, at least said front wall being transparent;

at least one thin planar collecting member having front and back surfaces and edges, said collecting member being disposed in said enclosure in spaced relationship to said walls;

tension means associated with said peripheral walls and said edges to entirely support said member in a planar configuration under all conditions of thermal contraction and expansion thereof;



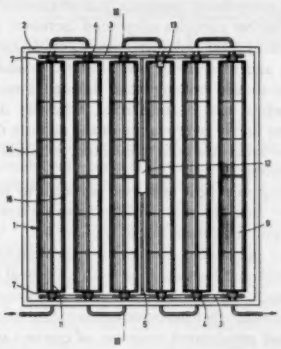
and means to transmit energy collected by said member for utilization thereof.

4,116,221

SOLAR ENERGY COLLECTING AND CONCENTRATING APPARATUS

Hans Zaugg, Weekendweg 1, Einigen, Canton of Berne, Switzerland (3646), and Harald Liebi, Bolgen, Zweisimmen, Canton of Berne, Switzerland (3770)

Filed Sep. 7, 1976, Ser. No. 720,728
Claims priority, application Switzerland, Sep. 11, 1975, 11707/75
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **1 Claim**



1. An installation comprising a frame, a plurality of transversely spaced units rockably supported within said frame for collecting and concentrating solar energy upon at least one pipe for conveying a heat-carrier each unit including a support structure having a pair of longitudinally spaced opposite transversely extending end plates and parabolic-cylindrical reflectors divided into sections and supported by said support structure, means for driving the reflectors to follow the position of the run including a motor drive, characterized in that each support structure includes at least two cradle members extending longitudinally between respective opposite end plates and having longitudinally extending grooves therein engaging corresponding opposite edge of said reflector sections and there are included first and second pinions mounted to respective opposite end plates of each support structure, a first transversely extending rack engaging the first pinions, a second transversely extending rack engaging the second pinions, the motor drive being centrally disposed relative to the installa-

tion, a longitudinally extending shaft coupled at the middle thereof to the motor drive and gears affixed to said shaft and engaging each of said racks to synchronously rock said energy collecting units.

4,116,222

PROCESS AND APPARATUS FOR COLLECTING SOLAR ENERGY

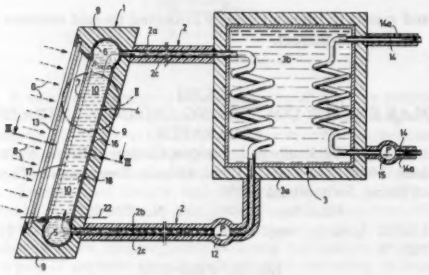
Walter Seifried, Wiesbaden, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 13, 1977, Ser. No. 759,009

Claims priority, application Fed. Rep. of Germany, Jan. 14, 1976, 2601170

Int. Cl.² F24J 3/02

U.S. Cl. 126—271 **22 Claims**



1. An improved process for converting solar energy into usable heat comprising passing a fluid mixture of a heat carrier and heat absorber particles suspended therein to a heating zone for exposure to solar radiation, passing said heated mixture to a heat sink and recovering heat therefrom, and recirculating the mixture to said heating zone through a non-heated zone disposed below said heating zone, whereby damage to the heating zone due to overheating of the mixture during circulation system breakdowns is prevented, wherein the improvement comprises:

a. selecting said heat absorber particles to have a specific gravity such that said particles separate from said mixture when said mixture is not in motion; and

b. feeding and passing said mixture through said non-heated zone and said heating zone with a vertical component of flow such that upon termination of mixture movement, said heat absorber particles will separate from said mixture into said non-heated zone out of contact with said solar radiation.

4. An apparatus for converting solar energy into usable heat energy, comprising:

a. a mixture of at least one fluid heat carrier and a quantity of heat absorber particles, said heat absorber particles having a specific gravity such that said particles separate from said mixture when said mixture is not in motion;

b. at least one solar collector for exposing said mixture to solar radiation, said collector comprising a closed container having a transparent front wall, a back wall mounted in spaced relation with said transparent front wall such that a relatively vertical mixture flow passage is defined therebetween, top and side walls for enclosing said flow passage, and compartment means disposed below said transparent front wall and vertically communicating with said flow passage for storing said heat transfer particles out of contact with said solar radiation; and

c. means for circulating said mixture through said solar collector.

4,116,223

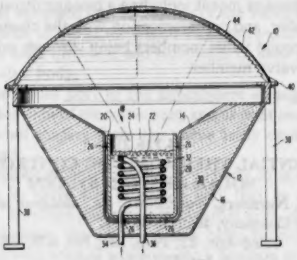
SOLAR ENERGY UNIT

Michael Vasilantone, 34 Columbia Rd., Somerville, N.J. 08876

Filed Jan. 18, 1977, Ser. No. 760,316

Int. Cl.² F24J 3/02

U.S. Cl. 126—271 **8 Claims**



1. A solar energy unit comprising a housing having a central cavity, a transparent dome on said housing covering said cavity, a reservoir in said cavity, a heat-absorbing liquid in said reservoir, a floating metal grid in said reservoir, heat exchange means in said reservoir immersed in said liquid and containing a heat exchange fluid, passageway means communicating said heat exchange means to a heat storage means, and means on said dome for magnifying and concentrating solar rays on said reservoir.

4,116,224

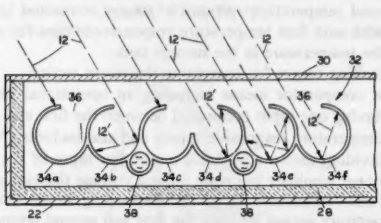
SOLAR ENERGY COLLECTION DEVICE

Raymond R. Lupkas, 54 Mt. Pleasant Dr., Trumbull, Conn. 06611

Filed Jan. 21, 1977, Ser. No. 761,422

Int. Cl.² F24J 3/02

U.S. Cl. 126—271 **8 Claims**



1. A collector for capturing solar rays and transferring the heat energy therein to a circulating fluid for utilization comprising:

A. a plurality of longitudinally extending adjoining tubes in heat exchange relationship with one another, each of said tubes having a longitudinally extending opening therein which subscribes an arc of approximately 90° and said openings are oriented in the first quadrant for half of the adjoining tubes and in the second quadrant for the other half of the adjoining tubes to permit a first portion of the interior of said tubes to be directly exposed to solar rays, said tubes having a second interior portion to be exposed to solar rays reflected from said first portion, the interior and exterior surfaces of said tubes having a heat absorbing coating thereon, and

B. at least one fluid carrying conduit located in heat exchange relationship with two of said tubes,

whereby when the collector is exposed to solar rays, a portion of the rays will strike the exterior surfaces of the tubes and a

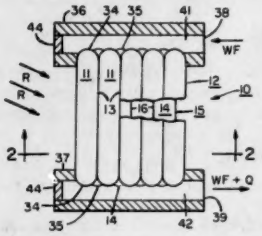
portion of the rays will pass through the openings in the tubes to directly strike the interior of the tubes where any reflected rays will strike another portion of the interior of the tubes to permit the tubes to absorb a greater measure of the available heat energy from the rays and said absorbed heat energy is transferred by conduction through the tubes to the fluid in the conduit for utilization.

4,116,225

SOLAR ENERGY COLLECTOR

Ugur Ortabasi, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Jul. 7, 1977, Ser. No. 813,545
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **37 Claims**



1. A solar energy collector structure comprising:

a plurality of partially evacuated tubular members substantially transparent to incident solar radiation, said tubular members having opposed lateral ends being arranged in a first group and lying adjacent one another in parallel axial alignment, means for joining each tubular member next to each adjacent tubular member of the group to form a self supporting tube sheet structure;

a second group of partially evacuated tubular members having opposed lateral ends joined as said first group to form a second tube sheet structure, said first and second tube sheets arranged adjacent each other in tandem to form at least one flow channel therebetween, means joining the lateral free ends of each tube sheet to an adjacent lateral free end of the other, for providing closure for and defining limits to the flow channel formed between said tube sheets, and

an absorber surface disposed in communication with said flow channel for intercepting and absorbing solar energy.

4,116,226

OIL SEPARATION AND HEAT RECOVERY SYSTEM

William J. Oakes, Chambersburg, Pa., assignor to Nibble With Gibble's Inc., Chambersburg, Pa.

Filed Apr. 6, 1977, Ser. No. 785,027
Int. Cl.[2] F24C *15/32*; A47J *36/38*
U.S. Cl. 126—299 D **6 Claims**

1. An oil separation and heat recovery system comprising,

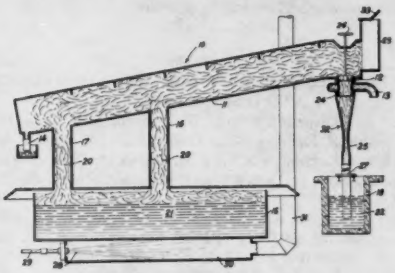
an inclined duct,

means supporting said duct adjacent a source of steam and oil vapor,

means connecting said duct to said source of steam and oil vapor,

a barometric condenser connected to the upper end of said duct,

water inlet means connected to said duct,



a hot water container at the lower end of said barometric condenser,

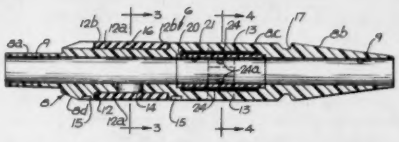
and a container for oil at the lower end of said duct.

4,116,227

COMBINATION CATHETER VENTING AND URINE SAMPLE COLLECTING UNIT AND METHOD OF MAKING THE SAME

Melvin I. Eisenberg, Chicago; Norman Levy, Highland Park, and Glenn L. Beall, Gurnee, all of Ill., assignors to Plasco, Inc., Gurnee, Ill.

Filed Jun. 28, 1976, Ser. No. 700,729
Int. Cl.[2] A61B *10/00*; A61M *25/00*
U.S. Cl. 128—2 F **7 Claims**



1. A combination catheter vent and urine sample collecting unit to be connected between a catheter extending to the bladder and a conduit extending to a urine collecting reservoir, said unit comprising: a one piece body of molded synthetic plastic material having a straight passageway extending longitudinally therethrough from an inlet end to an outlet end of said body aligned therewith, said body at the outlet end being adapted to receive and communicate with said conduit extending to said urine collecting reservoir and at the inlet end thereof being adapted to receive and communicate with said catheter extending to said bladder, said body having a laterally opening and extending urine collection needle-receiving aperture between said longitudinal passageway and the exterior of said body and a number of laterally opening and extending and circumferentially spaced venting apertures spaced longitudinally of said urine collection needle-receiving aperture and in air communication between said longitudinal passageway and the exterior of said body, an open-ended support tube in said body having a longitudinal passageway forming a continuation of said body passageway and having circumferentially spaced laterally opening and extending apertures communicating with the support tube passageway and in alignment with said laterally opening and extending venting apertures of said body, said support tube having a longitudinal opening therethrough in communication and in alignment with said body passageway, a bacteria and liquid impermeable and an air-permeable strip of filtering material supported on the outside of said support tube where it extends over said apertures in said support tube and underlies said venting apertures in said body where it makes liquid-sealing relation to the defining walls of said venting apertures in said body, and a urine collection needle punctur-

able self-sealing layer of material on said body covering said urine collection needle-receiving aperture and making a liquid and air sealing relationship with the defining walls of the latter laterally opening and extending aperture.

4,116,228

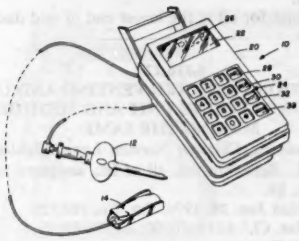
RESPIRATION DATA ACQUISITION, CONVERSION AND DISPLAY SYSTEM

Emmett L. Hudspeth; Philip C. Richardson; John L. Neathery, Jr.; Jerald P. Dykstra; Allen D. Boger, Jr.; William B. Sims, Jr.; Glenn E. Hunt, and Tony M. Quisenberry, all of Austin, Tex., assignors to United States Surgical Corporation, Stamford, Conn.

Division of Ser. No. 627,654, Oct. 31, 1975, which is a division of Ser. No. 385,699, Aug. 6, 1973, Pat. No. 3,940,742. This application Jul. 12, 1976, Ser. No. 704,450

Int. Cl.[2] A61B *5/08, 5/02*

U.S. Cl. 128—2 R **3 Claims**



1. A respiration data acquisition, conversion and display system comprising:

a respiration rate sensor having a resistance varying cyclically with respiration rate;

first means connected to the respiration rate sensor to generate a series of electrical output pulses having a repetition rate related to the cyclic change in the resistance of the respiration rate sensor;

means for generating a train of clock pulses,

a counter receiving the clock pulses, and triggered into an "on" state by a first specified number of output pulses of said first means and triggered into an "off" state by a second specified number of subsequent output pulses of said first means and where a total count registered represents the time period of the second specified number of output pulses representing the cyclic changes in the resistance of the respiration rate sensor;

a divider receiving the total count of the counter wherein the numerator of the divider is a scaling constant and the denominator of the divider is the total count of the counter and where the output of the divider represents the average respiration rate in respiration cycles per minute; and

display means connected to said divider for displaying the respiration rate.

4,116,229

ACOUSTIC IMAGING APPARATUS

Richard D. Pering, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 30, 1976, Ser. No. 718,721

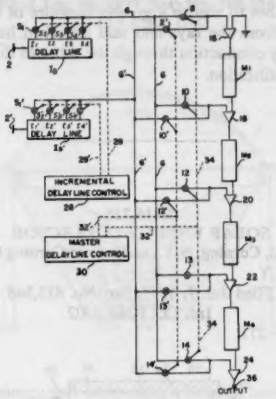
Int. Cl.[2] A61B *10/00*

U.S. Cl. 128—2 V **3 Claims**

1. In an apparatus for forming real time images of internal portions of the human body from reflections by internal tissue of transmitted short pulses of ultrasonic waves, the combination of

an array of receiving transducers,

a master delay line having a plurality of taps thereon and fixed delays between successive taps, and



means for selectively providing predetermined small amounts of incremental delay between each of said transducers and any one of said taps on said master delay line.

4,116,230

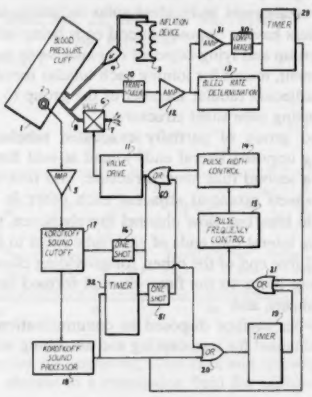
BLOOD PRESSURE CUFF AUTOMATIC DEFLATION DEVICE

Donald E. Gorelick, 43 Royal Crest Dr., Nashua, N.H. 03060

Filed Sep. 10, 1976, Ser. No. 722,135

Int. Cl.[2] A61B *5/02*

U.S. Cl. 128—2.05 M **10 Claims**



1. Apparatus for measuring blood pressure of a patient, comprising in combination:

(A) an inflatable cuff for mounting on a patient;

(B) inflation means connected to said cuff for inflating said inflatable cuff with air to above systolic pressure;

(C) an electrically controlled two state valve connected to said cuff for bleeding air from said inflatable cuff in a controlled manner;

(D) pressure transducer connected to said inflatable cuff for generating a signal as a function of the air pressure in said cuff;

(E) sound sensing means for detecting Korotkoff sounds while air is being bled from said inflatable cuff; and

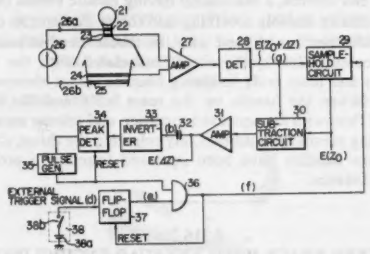
(F) control means connected between said pressure transducer and said electrically controlled valve for controlling the (1) frequency and (2) period of valve openings so

as to produce a relatively consistent bleed rate, said control means including (a) timing means for triggering valve openings for predetermined finite periods until said systolic pressure is reached; (b) means responsive to said Korotkoff sounds for triggering valve openings as a function of said Korotkoff sounds; (c) bleed rate determination means for comparing pressure drop caused by each said valve opening to a known reference value; (d) means for correcting the duration and frequency of said valve openings in response to signals from said pressure transducer; and (e) means responsive to said means for correcting generating signal pulses for opening said valve.

4,116,231
LIVING BODY FUNCTION MEASURING APPARATUS

Satoshi Matsuo, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Dec. 8, 1976, Ser. No. 748,403
Claims priority, application Japan, Dec. 10, 1975, 50-147159
Int. Cl.[2] A61B *5/05*
U.S. Cl. 128—2.1 Z **3 Claims**



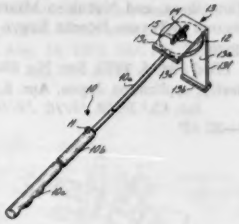
1. A living body function measuring apparatus comprising means for permitting a constant slight current of a high frequency wave of predetermined frequency to flow through a to-be-measured portion of the living body; means for detecting a voltage drop based on an impedance of the living body portion; a sample-hold circuit means connected to said detecting means for sampling a predetermined level of an output signal of the voltage detecting means and holding the sampled value; means connected to said detecting means and said sample-hold circuit means for obtaining a difference output between the output of said voltage detecting means and the output of the sample-hold circuit means; and means for applying automatically a trigger signal to the sample-hold circuit means according to a peak level of said output signal of the difference obtaining means, the peak level corresponding to an end of an expiratory phase of the living body.

4,116,232
SURGICAL RETRACTOR

Philipp Rabban, P.O. Box 390942, Miami Beach, Fla. 33139

Filed Mar. 7, 1977, Ser. No. 775,137
Int. Cl.[2] A61B *17/02*
U.S. Cl. 128—20 **5 Claims**

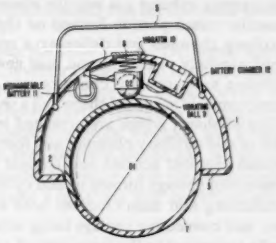
1. A hand held surgical retractor comprising a substantially straight shaft, a blade having substantially flat opposed faces, means for pivotally connecting the blade to one end of the shaft with the blade oriented substantially perpendicularly to the shaft and being free to turn about an axis substantially perpendicular to the shaft, the other end of the shaft being free, a handle formed at the free end of the shaft, an extremity of the blade most remote from the pivotal connection being free, and a rigid sole formed on the free extremity of the blade and defining substantially flat surfaces contiguous with and extending substantially perpendicularly from the flat faces of the blade beyond the thickness of the blade in opposite directions.



4,116,233
PORTABLE MASSAGER

Francis J. Scaduto, Rockford, Ill., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Mar. 14, 1977, Ser. No. 776,987
Int. Cl.[2] A61H *1/00, 15/00*
U.S. Cl. 128—32 **1 Claim**



1. A portable massager, comprising

a hand-sized housing having a hole formed through a first side thereof, said housing having a second side opposite the first side;

a handle mounted on the second side of the housing to accommodate a hand of a user with the palm on the second side whereby the housing is supported by the hand;

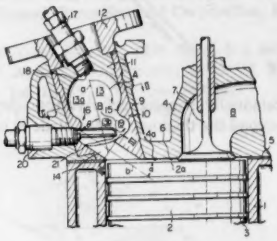
a massage ball of predetermined diameter larger than that of the hole through the first side of the housing mounted in the housing for free universal rotation in said hole whereby less than half the ball protrudes from said hole; and

motive means in the housing abutting the massage ball for imparting vibration and motion to said massage ball, said motive means comprising a vibrating ball spring biasedly mounted in the housing, a vibrating ball mounted on the spring in abutment with the massage ball, a vibrator mounted in the housing for vibrating the vibrating ball, said vibrating ball having a diameter smaller than the predetermined diameter and rechargeable battery means in the housing electrically connected to the vibrator for operating said vibrator.

4,116,234
INTERNAL COMBUSTION ENGINE WITH AN AUXILIARY COMBUSTION CHAMBER

Hiromichi Yanagihara, and Nobuhiro Miura, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jun. 6, 1977, Ser. No. 804,165
Claims priority, application Japan, Apr. 5, 1977, 52-38105
Int. Cl.[2] F02B *19/10, 19/16*
U.S. Cl. 123—32 SP 2 Claims

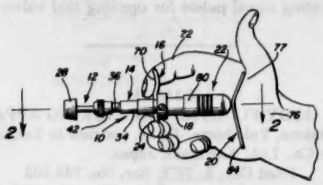


1. An internal combustion engine comprising:
a cylinder block having a cylinder bore therein;
a cylinder head having a cavity therein and mounted on said cylinder block, said cavity having an inner wall which defines an auxiliary chamber with an axis;
a piston reciprocally movable in said cylinder bore, said piston and said cylinder head forming a main chamber therebetween;
an intake valve movably mounted on said cylinder head for leading gas into said main chamber;
an exhaust valve movably mounted on said cylinder head for discharging exhaust gas into the atmosphere;
an annular raised portion formed on the inner wall of said auxiliary chamber and definning a restricted opening of approximately circular shape, said annular raised portion dividing said auxiliary chamber into a first chamber of approximately spherical shape and a second chamber of an ellipsoid shape, which are arranged in tandem along the axis of said auxiliary chamber and forming a recess in said second chamber beneath said annular raised portion;
a connecting passage formed in said cylinder head and communicating said main chamber with said auxiliary chamber, said connecting passage being arranged to be tangentially connected to the inner wall of said second chamber for creating a swirl motion of the gas at the time of the compression stroke;
a fuel injector having an injecting nozzle disposed in said auxiliary chamber and directed to said recess located opposite to the inner wall to which said connecting passage is tangentially connected with respect to the axis of said auxiliary chamber for forming a rich air-fuel mixture in said recess, and;
a spark plug having a spark gap located in said recess for igniting the rich air-fuel mixture formed therein, wherein said connecting passage has an approximately elliptical cross-section which has a major axis and a minor axis, a ratio of the length of said minor axis to the length of the major axis being in the range of 0.4 through 0.6, an angle between the axis of said connecting passage and a plane defined by the flat top surface of said piston being in the range of 25° through 45°, an angle between an axis of said connecting passage and the axis of said auxiliary chamber being in the range of 30° through 50°, a ratio of the cross-sectional area of the connecting passage to the volume of the auxiliary chamber being in the range of 0.05 through 0.1 cm^{-1}, the sum of the volumes of said auxiliary chamber and the connecting passage being more than 80 percent of the sum of the volumes of the auxiliary chamber, the connecting passage and said main chamber when said piston reaches the top dead center.

4,116,235
CHIROPRACTIC ADJUSTING INSTRUMENT

Arlan W. Fuhr, and Warren C. Lee, both of 821 E. Bridge St., Redwood Falls, Minn. 56283

Filed Jun. 20, 1977, Ser. No. 808,382
Int. Cl.[2] A61F *5/00*
U.S. Cl. 128—69 6 Claims

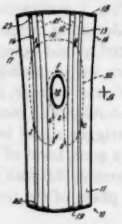


1. A chiropractic adjusting instrument comprising a longitudinally movable thrust element having a body contact member on one end thereof, a main body having handle means thereon longitudinally slidably receiving said thrust element, an opposing handle member aligned with the thrust member and main body, compression spring means associated with the thrust member and main body to spring bias the thrust element outwardly when the handle on the main body and the handle aligned therewith are squeezed together, and release means for the spring means for automatically releasing the thrust element when the handles have been squeezed together a predetermined distance.

4,116,236
KNEE BRACE WITH KNEECAP-ENCIRCLING FLEXIBLE RESILIENT PAD

William J. Albert, Cincinnati, Ohio, assignor to Surgical Appliance Industries, Inc., Cincinnati, Ohio

Filed Feb. 14, 1977, Ser. No. 768,031
Int. Cl.[2] A61F *3/00*
U.S. Cl. 128—80 C 14 Claims



1. An improved knee brace comprising:
a one piece, continuous, generally cylindrical sleeve formed of elastic material stretchable in a circumferential direction and dimensioned to cover the leg area at the knee joint, said sleeve having a forward section with an opening therein to accommodate the kneecap area of the wearer, a rear section, and oppositely disposed side sections intermediate said forward and rear sections,
a flexible interior pocket disposed in the interior of the sleeve surrounding said kneecap opening adjacent at least the top and sides of said opening, said flexible pocket being secured to said sleeve,
a one piece inverted U-shaped resilient flexible pad disposed in said interior pocket and having integral upper and opposite side sections to surround the upper and lateral

portions of the wearer's kneecap, respectively, said pad being relatively inelastic compared to said sleeve in a direction circumferentially encircling said knee to resist rearward movement and dislocation relative to the wearer's kneecap of said opposite side pad sections when the wearer's knee is flexed,

a plurality of longitudinal strips formed of an inelastic material stitched to the forward and side sections of said sleeve on the exterior surface thereof and extending substantially the full length of said sleeve, said strips cooperating with said sleeve to form a plurality of pockets, said pockets disposed on each side of the wearer's knee and being laterally spaced from each other to collectively overlie opposite sides of the wearer's knee from the edges of the kneecap to the ligaments running along the sides of the knee, and

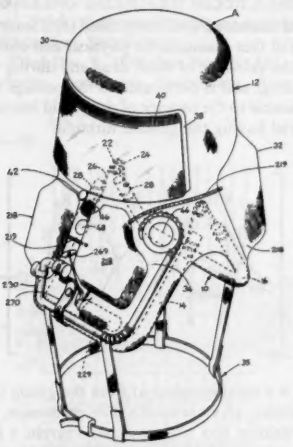
a plurality of flexible pressure elements, each of said pressure elements comprising two interleaved and overlapping flattened helical springs and end caps for holding said springs in assembled relation, each of said springs being mounted within one of said pockets and extending over a substantial portion of the length of said sleeve.

4,116,237

EMERGENCY BREATHING APPARATUS

Norman Birch, 1709 Mantis Ave., San Pedro, Calif. 90732

Filed Feb. 7, 1977, Ser. No. 766,063
Int. Cl.[2] A62B 7/00
U.S. Cl. 128—142.7 **39 Claims**



1. An emergency breathing apparatus for donning by an individual to create a substantially air-tight breathing plenum for the individual; said apparatus comprising:

(a) frame means comprising a relatively rigid frame section,

(b) said frame section having a chamber means formed therein capable of containing a supply of an oxygen containing gas,

(c) a hood formed of a relatively flexible substantially air-impervious material operatively located over a portion of said frame means and sized to be disposed over the head of an adult individual to form a breathing plenum,

(d) gas dispensing means comprising an outlet means on said frame section to permit the dispensing of said gas from said chamber means to said plenum when said apparatus is donned by an individual, and

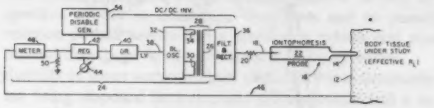
(e) switch means automatically responsive to the donning of said apparatus for automatically dispensing the gas from the chamber to the plenum.

4,116,238

HIGH VOLTAGE CONSTANT CURRENT SOURCE FOR IONTOPHORESIS

David Pettijohn, Watertown, Mass., assignor to Midgard Electronics Company, Inc., Watertown, Mass.

Filed Aug. 18, 1976, Ser. No. 715,538
Int. Cl.[2] A61N 1/30
U.S. Cl. 128—172.1 **2 Claims**



1. A high voltage DC regulated blockage clearing current source and iontophoresis system comprising:

an animal body under study;

an iontophoresis probe located for ion injection into said body;

a DC-to-DC inverter providing a relatively high voltage rectified DC squarewave output in response to a relatively low voltage DC input;

a feedback circuit responsive to the rectified DC squarewave voltage output at said relatively high voltage and including in circuit said iontophoresis probe and animal body under study in which the inverter output is applied to said probe;

means responsive to the magnitude of current flowing through said feedback circuit for developing a DC signal representative of the magnitude thereof; and

means for applying said DC signal as the relatively low voltage DC input to said DC-to-DC inverter in a polarity to provide negative feedback in said feedback circuit and to maintain a predetermined current from said inverter to said probe; and

means for adjusting the level of said DC signal applied to said DC-to-DC inverter to adjust the regulated magnitude of the relatively high voltage DC output of said DC-to-DC inverter to operate in the range of a few hundred volts or less in the absence of probe blockage and a relatively high current in said feedback circuit and to operate in a range of at least approximately 1500 volts in response to a probe blockage and a relatively low current in said feedback circuit.

4,116,239

ULTRASONIC OXYGENATION INSTRUMENT

Sol J. Ewen, 107-21 Queens Blvd., Forest Hills, N.Y. 11375

Filed Jun. 14, 1974, Ser. No. 479,549
Int. Cl.[2] R61M 13/00
U.S. Cl. 128—184 **7 Claims**

1. An ultrasonic oxygenation instrument for the treatment of diseased tissue or other sites requiring treatment, said instrument comprising:

(A) an ultrasonic transducer having a nozzle attached thereto, whereby when the transducer is energized, the nozzle is caused to vibrate at an ultrasonic rate;

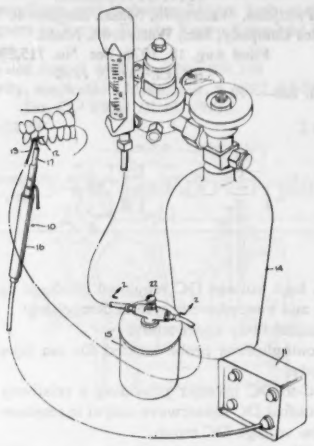
(B) a high-frequency generator connected to said transducer to energize same;

(C) a pressurized source of oxygen of a purity which is medically acceptable:

(D) an atomizer containing liquid; and

(E) means coupling said source to said nozzle through said atomizer to feed oxygen intermingled with said liquid

thereto, whereby oxygen intermingled with liquid passing through said vibrating nozzle and emitted therefrom as a jet is ultrasonically activated to render it highly reactive with said tissue.

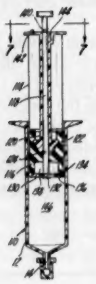


4,116,240

MIXING SYRINGE

Aeneas C. Guiney, 2855 Silverhill, Pontiac, Mich. 48055

Filed Mar. 11, 1977, Ser. No. 776,528
Int. Cl.[2] A61M 5/00
U.S. Cl. 128—218 M 4 Claims



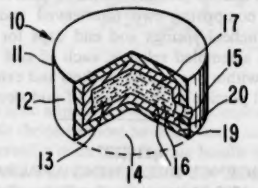
1. A syringe assembly for storing two different materials separately in readiness for mixing together and for injection as a liquid at the time of use, the combination of; a cylinder, a discharge port formed in a wall of said cylinder for communication with the interior of said cylinder, a plunger slidably disposed in said cylinder and projecting from an open end thereof opposite to said discharge port, said plunger forming a first chamber therein, a second chamber formed in said cylinder between said plunger and said discharge port, a movable wall member separating said first and said second chambers from each other, said second chamber being adapted to contain one of the materials to be mixed and said first chamber being adapted to contain the other of said materials, an actuating member supported for axial movement relative to said plunger, one end of said actuating member being connected to said wall and being operative to move said wall to a position communicating said first and said second chambers with each other, said plunger being movable toward said discharge port to displace said mixed materials from said cylinder and lock means for holding said rigid wall member in closed relationship with said plunger during movement of the latter to maintain said first and second chambers isolated from each other.

4,116,241

OSMOTIC SYSTEM WITH LAMINATED WALL COMPRISING STRUCTURALLY DIFFERENT SEMIPERMEABLE LAMINA

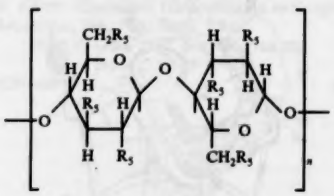
Felix Theeuwes, Los Altos, and Atul D. Ayer, Belmont, both of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Continuation of Ser. No. 654,194, Feb. 2, 1976, Pat. No. 4,014,334. This application Dec. 15, 1976, Ser. No. 750,773
The portion of the term of this patent subsequent to Mar. 29, 1994, has been disclaimed.
Int. Cl.[2] A61K 9/24, 9/44
U.S. Cl. 128—260 11 Claims

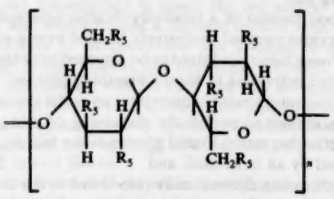


1. An oral osmotic system sized and adapted for the controlled administration of drug to an animal, said system comprising:

a. a shaped laminated wall comprising (1) a lamina formed of a material that maintains its physical and chemical integrity in the presence of fluid, drug and during the dispensing of drug, and is permeable to the passage of fluid and impermeable to the passage of drug, said lamina formed of a material having the general formula:



wherein R_5 is a member selected from the group consisting of hydroxyl, alkoxy, alkylcarbonate, alkylcarbamate, alkylsulfonate, alkylsulfamate and acyloxy, and wherein n is a positive number greater than 5 and at least one R is acyloxy, said lamina laminated to (2) a lamina formed of a different material that maintains its physical and chemical integrity in the presence of fluid, drug and during the dispensing of drug, and is permeable to the passage of fluid and impermeable to the passage of drug, said lamina formed of the different material selected from the general formula:



wherein R_5 is a member selected from the group consisting of

hydroxyl, alkoxy, alkylcarbonate, alkylcarbamate, alkylsulfonate, alkylsulfamate, and acyloxy, and wherein n is a positive number greater than 5 and at least one R is acyloxy; the wall surrounding and forming,

b. a compartment containing a member selected from the group consisting of locally and systemically acting drugs;

c. a passageway in the wall communicating with the compartment and the exterior of the system for administering drug from the system; and,

d. wherein in operation when the system is in the animal fluid therefrom is imbibed through the laminated wall into the compartment in a tendency towards osmotic equilibrium at a rate determined by the permeability of the laminated wall and the osmotic pressure gradient across the laminated wall thereby continuously dissolving drug that is administered according to the following equation:

$$h_T/k\pi_T = h_1/k\pi_1 + h_2/k\pi_2$$

wherein h_T is the thickness of the laminated wall, h_1 is the thickness of lamina (1,) h_2 is the thickness of lamina 2, $k\pi_T$ is the osmotic pressure of drug in the compartment times the permeability of the laminated wall to fluid, $k\pi_1$ is the osmotic pressure of drug in the compartment times the permeability of lamina (1) to fluid and $k\pi_2$ is the osmotic pressure of drug in the compartment times the permeability of lamina (2) to fluid, through the passageway at a controlled and continuous rate over a prolonged period of time.

4,116,242

JACQUARD MACHINE HAVING MEANS FOR CONTROLLING JACQUARD NEEDLE MOTION

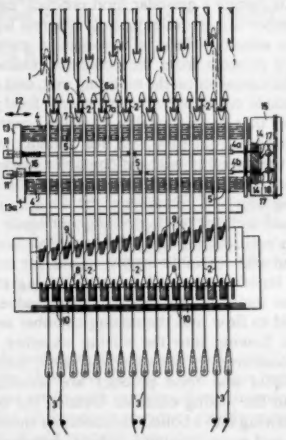
Robert Bucher, Frick, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Dec. 8, 1976, Ser. No. 748,515

Claims priority, application Switzerland, Dec. 19, 1975, 16482/75

Int. Cl.² D03C *3/16, 3/06*

U.S. Cl. 139—59 **9 Claims**



1. A jacquard machine for controlling warp yarns in a weaving machine comprising

a plurality of reciprocally mounted griffes;

a plurality of lifting wires for engaging with respective ones of said griffes;

a reciprocable drive element;

a plurality of jacquard needles extending longitudinally thereof from said drive element in a pressing direction, each said needle engaging a respective lifting wire for pressing said wire in said pressing direction into a position to be engaged with a respective griffe, each said needle being rotatably secured to said drive element for movement therewith in a direction opposite said pressing direction and having coupling pins engaging a respective wire and a flat section;

a pair of sliding members disposed about each flat section of a respective needle, each sliding member having a keyhole shaped aperture through which a flat section of a respective needle passes and is engaged against rotation, said sliding members being movable relative to said respective needle to disengage therefrom and to permit rotation of said needle into a position in which said pins thereof disengage from said respective lifting wires;

a plurality of force accumulators, each said force accumulator being disposed between said drive element and a respective needle to permit relative movement between said respective needle and said drive element in said pressing direction; and

a selector for selecting the jacquard needles to be moved in said pressing direction.

4,116,243

JET LOOM

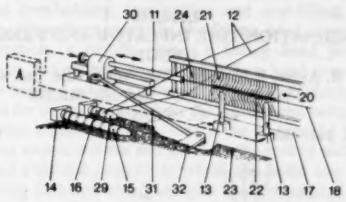
Alfons Vettiger, Tann-Ruti, Switzerland, assignor to Ruti Machinery Works Ltd., Ruti, Switzerland

Filed Mar. 31, 1977, Ser. No. 783,423

Claims priority, application Switzerland, Apr. 13, 1976, 4729/76

Int. Cl.² D03D *47/28*

U.S. Cl. 139—435 **8 Claims**



1. Jet loom having a device for the inserting of filling yarns by means of a gaseous fluid, a reed for beating up the inserted filling yarns to the fell of the cloth and temples arranged on both sides of the cloth, said reed comprising reed teeth provided with recesses, which recesses together form a channel for the gaseous fluid and straight reed teeth, the reed teeth with recesses being provided along the portion of the reed between the inner ends of the temples and the straight reed teeth being provided along the portions of the reed along the temples, the rearmost region of the recesses lying in the plane defined by the front edges of the straight reed teeth.

4,116,244

MULTISPOT WELDING MACHINE

Josef Ritter, Graz; Alois Sackl, Liezen; Klaus Ritter, and Gerhard Ritter, both of Graz, all of Austria, assignors to EVG Entwicklungs-u. Verwertungs- GmbH, Graz, Austria

Filed Feb. 23, 1977, Ser. No. 771,268

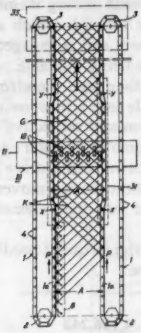
Claims priority, application Austria, Mar. 23, 1976, 2140/76

Int. Cl.² B21F *27/10*

U.S. Cl. 140—112 **6 Claims**

1. In a multispot welding machine for producing a mesh web from arrays of wires running skew to the longitudinal direction of said web and crossing one another, said machine being of the kind having two endless synchronizing circulating feeders which carry deflector-pins and each of which has a straight working run, said working runs being uniformly spaced from one another and each defining a different one of the edges of said mesh web to be produced, a wire layer which is movable to and fro across said working runs and is arranged to lay at

substantially right angles to said working runs a member of wires alternatively about a corresponding number of deflector-pins on said working runs and a welding zone having means for welding said wires together at the crossover points thereof; the improvement which comprises an auxiliary drive mechanism



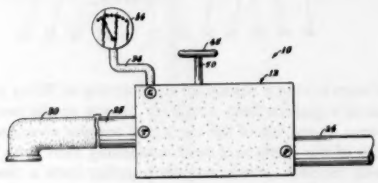
for said wire-layer, said drive mechanism being adapted of imparting to said wire-layer, each time after said wire-layer crosses over one of said feeder working runs, an additional rapid forward motion and a subsequent backward motion in a direction parallel to said working runs, whereby loops of wire are laid around said deflector-pins.

4,116,245

COMBINATION TIRE INFLATOR AND PRESSURE GAUGE

Wayne R. Ayers, R.R. 4, Box 218, Noblesville, Ind. 46060

Filed Jul. 13, 1977, Ser. No. 815,298
Int. Cl.[2] B65B *3/26*
U.S. Cl. 141—98 **10 Claims**



1. A combination tire inflator and pressure gauge means, comprising:

a body member means;

a pressure gauge; and

a valving member;

the body member means having a vent means, and being provided with passage means respectively operatively communicating with an associated source of pressure, the tire, and the pressure gauge;

the valving member and the body member means being provided to have three relative positions or settings of the valving member, said positions or settings being such as follows:

in a first relative position or setting there is provided communication between the gauge passage and the tire passage, the pressure-source passage being non-communicating with either of them or the vent means, thus the gauge indicating tire pressure;

in a second relative position or setting there is provided communication between each of the gauge passage and the tire passage with the vent means, the pressure-source passage being non-communicating with either, thus venting air from the tire; and

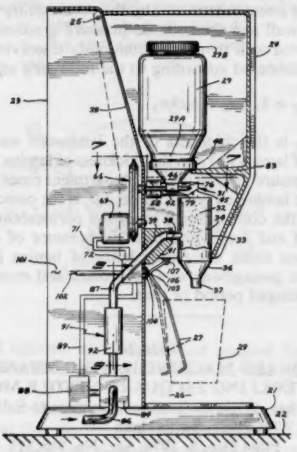
in the third relative position or setting there is provided communication between the pressure-source passage and the tire passage, but communication with either is blocked to the gauge passage and vent means, thus inflating the tire by air from the associated pressure source.

4,116,246

BEVERAGE DISPENSER

Raymond E. Franzen, Anoka, Minn., assignor to Medalie Manufacturing Co., Minneapolis, Minn.

Filed Oct. 12, 1976, Ser. No. 731,624
Int. Cl.[2] B65B *1/04*
U.S. Cl. 141—362 **28 Claims**



1. A machine for dispensing a beverage made by mixing a liquid with a granular food product comprising: a base adapted to engage a support, an upright wall mounted on the base, a container for storing a granular food product, means having a mixing chamber and an outlet passage wherein liquid and food product are mixed to form a beverage, a metering unit to receive food product from the container, means detachably mounting the container on the metering unit, said metering unit having rotatable means operable to dispense food product from the metering unit to said mixing chamber, cantilever mount means extending from said wall for slidably receiving and supporting the metering unit and container carried thereby on the wall above said base, said mount means thereby allowing the metering unit and container to be slidably removed as a unit from said wall for refill, cleaning and repair as necessary, drive means mounted on the wall engageable with and operable to rotate said rotatable means, means for controlling the amount of liquid discharged into the mixing chamber, said latter means including an on-off control valve operable to permit liquid to flow into the mixing chamber and to prevent liquid from flowing into the mixing chamber, and control means for concurrently actuating the drive means and valve whereby liquid and food product are simultaneously discharged into the mixing chamber forming the beverage, said beverage flowing into a collection container through the outlet opening in said means having a mixing chamber.

4,116,247

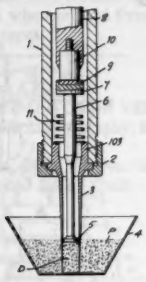
DOSING DEVICE

Luciano Zanasi, Bologna, Italy, assignor to Zanasi Nigris S.p.A., Bologna, Italy

Filed Mar. 4, 1977, Ser. No. 774,348
Claims priority, application Italy, Mar. 5, 1976, 12515 A/76
Int. Cl.[2] B65B *1/24*
U.S. Cl. 141—392 **3 Claims**

1. A dosing device, particularly for the filling of capsules with a pharmaceutical substance, comprising

(a) a tubular housing movable vertically up and down;
(b) a hollow punch having a cavity therein and removably secured to the lower end of said tubular housing;
(c) a piston slidably movable within said cavity said piston being provided at the lower end of a piston rod the upper end of which extends inside said tubular housing.
(d) an actuating rod vertically movable at the interior of the tubular housing and capable of contacting with its lower



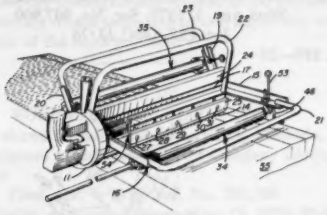
end the upper end of said piston rod, thereby imparting vertical movement to said piston rod;
(e) a permanent magnet at at least one of the contacting ends comprising the lower end of said actuating rod and the upper end of said piston rod;
(f) said contacting ends of the actuating rod and of the piston rod being flat horizontal surfaces, whereby relative sliding movement is permitted between the said surface while maintaining the magnetic connection between them.

4,116,248

APPARATUS FOR TEXTURIZING A MATERIAL

Wayne F. Erwin, Wooster, Ohio, assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Sep. 23, 1977, Ser. No. 835,857
Int. Cl.[2] B27G *13/00*
U.S. Cl. 144—2 R **3 Claims**



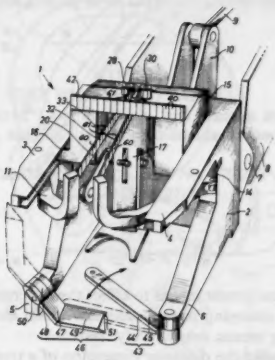
1. A portable surface texturizing apparatus which comprises:
(a) a portable chain saw having a saw chain bar carrying a rotable saw chain with cutters affixed thereto;
(b) a plurality of mounting members fixably mounted to the chain bar of said portable saw chain;
(c) a plurality of handles fixably mounted to said mounting members;
(d) a plurality of bar supports adjustably mounted along the chain bar, said bar supports having a beveled side extending longitudinally along the chain bar such that the beveled side will contact the surface of a work piece thereby to restrain the depth of cut;
(e) means for guiding said portable chain saw along the material to be surfaced; and
(f) angle support means for providing support for said portable chain saw and maintaining said portable chain saw at the proper angle.

4,116,249

APPARATUS FOR CUTTING, FELLING, AND DEBRANCHING TREES

Lars Gunnar Högberg, and Bo Gunnar Ekeborg, both of Bonassund, Sweden, assignors to Mo och Domsjo Aktiebolag, Ornskoldsvik, Sweden

Filed Mar. 10, 1977, Ser. No. 776,385
Claims priority, application Sweden, Mar. 15, 1976, 7603282
Int. Cl.[2] A01G *23/08*
U.S. Cl. 144—3 D **14 Claims**



1. An apparatus for cutting, felling, and debranching trees combining tree-holding, tree-cutting and tree-felling means with tree-debranching means in one felling head, comprising, in combination, a mobile crane; a felling head pivotably mounted on the mobile crane; the felling head comprising means for holding a tree, means for cutting and felling a tree, and means for debranching a tree; the felling head being pivotable between a first position in which the tree can be held by the holding means, and cut and felled by the cutting and felling means; and a second position in which the felled tree can be moved along its longitudinal axis past and debranched by the debranching means, and the debranching means comprises first debranching means, second debranching means and third debranching means and a support means movable reciprocably with respect to the felling head and carrying at least in part the first, second and third debranching means and a holding means, the holding means, debranching means and support means being coordinately and combinably movable with respect to each other, so as to embrace a tree therebetween.

4,116,250

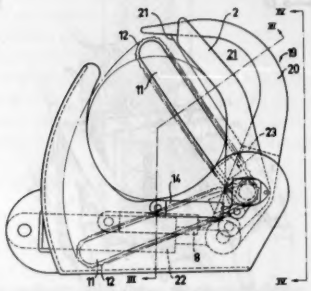
TREE FELLING UNIT

Jan-Eje Ericsson, Sundsvall, Sweden, assignor to Umeå Mekaniska AB, Umea, Sweden

Filed Oct. 1, 1976, Ser. No. 728,647
Claims priority, application Sweden, Oct. 7, 1975, 7511207
Int. Cl.[2] A01G *23/08*
U.S. Cl. 144—34 R **1 Claim**

1. A tree-felling unit comprising
a substantially U-shaped stand with a tree-receiving space;
at least one clamping means mounted in said stand for clamping the stand against a tree received in said space and to be felled;
a saw chain means supported by said stand for operative movement into said space to perform an incomplete saw-through of such tree;
a shearing means supported by the stand at substantially the same level as the saw chain means for a shearing movement substantially in an opposed direction to that of the operative movement of the saw chain means,
said saw chain means being mounted for operative movement from a protective position within said stand into the tree-receiving space in a direction away from said stand;

said shearing means, the shearing movement of which is substantially opposed to the operative movement of said saw chain means, being movable, at least with its cutting edge, all the way into the bottom plane of the tree-receiving space of the stand thereby making it possible for said shearing means also to effect a direct cutting of a tree having a diameter smaller than a predetermined diameter;



independent power means to effect the different movements of said clamping means, said saw chain means and said shearing means, respectively; and

means sensing the diameter dimension of a tree to be felled, to start the operative movement of the saw chain means when sensing a tree having a diameter greater than said predetermined diameter and to start the cutting movement of the shearing device when sensing a tree having a diameter smaller than said predetermined diameter.

4,116,251

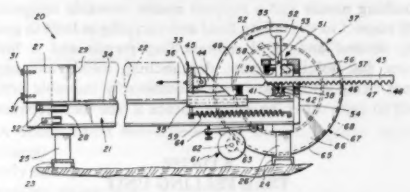
LOG SPLITTER WITH GEAR RACK DRIVE

Francis X. Graney, 50 Vale St., Tewksbury, Mass. 01876

Filed Jul. 22, 1977, Ser. No. 818,125

Int. Cl.[2] B27L *7/00*

U.S. Cl. 144—193 R **8 Claims**



1. A log splitter of the type having a horizontal, log-supporting, track, a splitter blade upstanding at one end of said track, a log-pusher carriage mounted to reciprocate along said track and power means for driving said carriage to push a log against said blade to split the same, characterized by:

said power means comprising:

a spur gear rotatably mounted at the other end of said track;

an elongated gear rack having a forward end pivotally connected to said carriage and having teeth adapted to engage the teeth of said spur gear but normally poised at a spaced distance therefrom;

control mechanism for selectively engaging and disengaging said teeth;

a drive motor, with a drive shaft unidirectionally rotating said spur gear to advance said gear rack and carriage, with a log supported on said track, into splitting engagement with said blade;

and retraction means for retracting said carriage when said teeth are disengaged.

4,116,252

METHOD AND APPARATUS FOR PRODUCING BASEBALL BATS

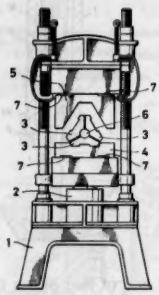
Yosaku Ikeda, 7229 Fukumitsu-cho, Nishitonami-Gun, Toyama-ken, Japan

Continuation-in-part of Ser. No. 655,424, Feb. 5, 1976, abandoned. This application Oct. 3, 1977, Ser. No. 838,847

Claims priority, application Japan, Oct. 13, 1975, 50-139155

Int. Cl.[2] B29C *15/00*; B29G *7/00*

U.S. Cl. 144—309 D **2 Claims**



1. A method of producing baseball bats which comprises the steps of: forming a wood baseball bat having an initial diameter somewhat larger than the prescribed dimension; impregnating thermosetting resin into said baseball bat sufficiently to effect hardening to withstand heavy impact in the finished product; treating said impregnated bat with heat at about 100° to 120° C and pressure in a mold comprising at least three divided mold sections, said method including intermittent partial rotation in said mold with increased pressure; and thereafter maintaining said bat in said mold at a further increased pressure for a predetermined period.

4,116,253

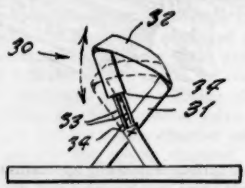
SNATCH PROOF HANDLE FOR POCKETBOOKS, HANDBAGS AND THE LIKE

Benjamin Watsky, 137-28 Northern Blvd., Flushing, N.Y. 11354

Filed Aug. 1, 1977, Ser. No. 807,900

Int. Cl.[2] A45C *13/26*

U.S. Cl. 150—33 **1 Claim**



1. An article of manufacture, comprising in combination, a hand-supported object such as a handbag, and a pair of handles attached to said handbag, said handles incorporating means to prevent readily falling from a persons hand or being forcibly pulled away therefrom; said handbag comprising a body of a pair of opposite side panels and a narrow side and bottom edge panel therebetween, an opening at a top of said handbag being selectively closable by a flap secured to one side panel of said handbag and being attached to the opposite side panel thereof by interconnectable Velcro elements, said handles being comprised of a pair of straps, one of said straps secured at its opposite ends to one of said sides of said handbag and the other of said straps secured at its opposite ends to the other side of said

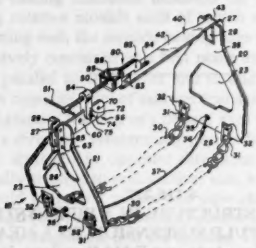
handbag, a longitudinal center portion of each strap is twisted one-half way around to form a loop with a crossing junction closing said loop, said crossing junction being stitched thereby forming said loop, said loops being vertically aligned in use and being of a size to receive an entire hand of a person up to his wrist and encircle the wrist from opposite sides of said handbag, each strap is of tubular construction, each strap at its loop being parted so to form a pair of loop ends, a plurality of stretchable tapes between said loop ends, opposite ends of said tapes being secured inside said tubular strap, and said tapes being of a length so that when relaxed from stretch, said loop ends abut and hide said tapes.

4,116,254

ANTI-SKID ATTACHMENT FOR VEHICLE TIRES

Walter V. Seip, 6738 Gilley Ave., Burnaby, B. C., Canada (V5H 3W9)

Filed Jan. 24, 1977, Ser. No. 762,045
Int. Cl.² B60C *27/02*
U.S. Cl. 152—233 **11 Claims**



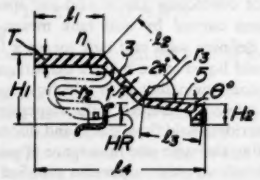
1. An anti-skid attachment for a vehicle tire mounted on a wheel having transverse openings comprising opposing side wall plates having shoulder portions and bead portions, a traction member connected at opposite ends thereof to the shoulder portions, tensioning means passable through a wheel opening to interconnect the bead portions, said tensioning means including a clamping shaft and a nut engaged thereby, said clamping shaft being rotatable to draw the bead portions together and apply corresponding tension to the traction member, and mounting means including an arm adjustably securing the nut to one of the bead portions.

4,116,255

FOLDABLE PNEUMATIC TIRE

Hiroshi Hayakawa, Kodaira, and Sakae Ezura, Matsudo, both of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Apr. 7, 1977, Ser. No. 785,708
Claims priority, application Japan, Apr. 15, 1976, 51-41887
Int. Cl.² B60C *5/00*
U.S. Cl. 152—352 R **6 Claims**



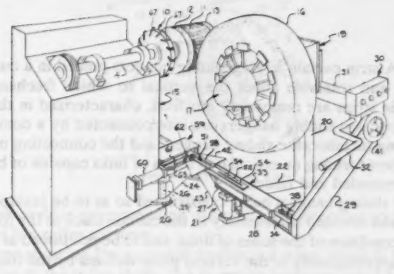
1. In a foldable pneumatic tire including a substantially annular tread centrally located and sidewalls axially outwardly extending with slopes toward a rotating axis of the tire from both ends of said tread and terminating in inextensible bead portions, respectively, said sidewalls being foldable axially inwardly toward each other to be collapsed substantially inside said tread, the improvement comprising, when the tire is in an unfolded condition, each of said bead portions extends substantially perpendicular to the rotating axis and has a height 1.2 to 2.0 times of that of a flange of a rim, each said sidewall comprising a first sidewall axially inside and a second sidewall axially outside making an angle with each other in the range of 140° to 160°, and said second sidewall forming a substantially flat outer surface sloping at an angle not greater than 5° to the rotating axis.

4,116,256

TIRE BUFFING APPARATUS

Jerry M. Morris; Leon Jay Cole, and Vaughn Rawls, all of Lima, Ohio, assignors to National-Standard Company, Niles, Mich.

Filed Apr. 22, 1976, Ser. No. 679,361
Int. Cl.² B29H *21/08*
U.S. Cl. 157—13 **12 Claims**



1. In a tire buffing apparatus including in combination:

a housing

movable frame means supported with respect to said housing, said movable frame means adapted to receive and mount a tire casing for rotation on a normal axis, said axis of rotation of said tire casing being movable within a plane,

a texturizing wheel and one finishing wheel on each side of said texturizing wheel, said wheels being rotatably mounted on said housing on an axis substantially within the plane of the axis of rotation of the tire casing,

cam means mounted to said housing, said cam means corresponding to the shape of said texturizing and said finishing wheels,

linear guide means mounted to and extending outwardly from said housing and lying in a plane which besects and is perpendicular to the rotational axis of the said texturizing wheel,

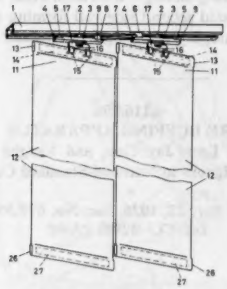
template guide means mounted to said movable frame, said template guide means corresponding to the desired profile of a buffed tire casing, and

cooperating means mounted to said movable frame and engageable with said linear guide means wherein the movement of said movable frame engages said template guide means with said cam means while said cooperating means and said linear guide means maintains a predetermined point which is substantially on the bisector of the tire casing perpendicular to the axis of the rotation of the tire casing on a line in a plane which bisects and is perpendicular to the rotational axis for said texturizing wheel and substantially perpendicular to the axis of rotation of said wheel thereby permitting engagement of said texturizing wheel with the crown of the tire casing and permitting engagement of said finishing wheels with predetermined portions of the sidewalls of the tire casing.

4,116,257
STRIP CURTAIN

Konrad Bratschi, Haldenweg 29, 3074 Muri, Switzerland

Filed Apr. 13, 1977, Ser. No. 787,168
Claims priority, application Fed. Rep. of Germany, Apr. 17, 1976, 7612227[U]
Int. Cl.[2] E06B *9/30*
U.S. Cl. 160—168 R 6 Claims



1. A strip curtain having sliding hangers guided in a curtain track and rotatable about the vertical to which freehanging curtain strips are removably attached, characterized in that

every two sliding hangers are interconnected by a connecting member, the sliding hangers and the connecting members forming an articulated series of links capable of being extended and folded,

the sliding hangers being constructed so as to be juxtaposed and oriented transversely to the curtain track in the folded condition of the series of links, and to be positioned at least approximately in the vertical plane defined by the track in the extended condition of the series of links,

the upper end of the curtain strip having an upper seam reinforced by an elongated plate inserted in the seam, and a holder pushed down over the upper end, the plate having apertures and the holder having corresponding protrusions removably engageable in the apertures of the plate,

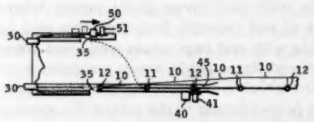
the sliding hanger having a member cooperating with the holder onto which the holder can be snapped in either of two positions, the plane of the curtain strip forming an acute angle α with the axis of the sliding hanger whereby, in either of said positions, the curtain strips touch each other in the one position and are spaced from each other in the other position when the series of links is extended, and

the curtain strips being snapped onto the sliding hangers.

4,116,258
PANEL DEPLOYMENT AND RETRACTION SYSTEM

Paul Slysh, and LeRoy E. Siden, both of San Diego, Calif., assignors to General Dynamics Corporation, San Diego, Calif.

Filed Jan. 18, 1978, Ser. No. 870,305
Int. Cl.[2] E06B *3/32*
U.S. Cl. 160—213 9 Claims



1. An improved panel deployment and retraction system of the type wherein a plurality of panels are hinged together in an end-to-end relation and alternately folded into an accordian folded stack, said panels adapted for unfolding between two deployment frames and subsequently being extended beyond said frames to form an elongated array of a type which may later be sequentially creased and folded, one pair of panels at a time, to reform an accordian folded stack, wherein the improvement comprises:

a plurality of rollers, one roller rotatably mounted to each end of each panel hinge, said rollers disposed in an upper row and a lower row when said panels are in an accordian folded stack;

a curved raceway formed in each deployment frame and adapted to guide rollers disposed in said upper row;

a straight raceway formed in each deployment frame and adapted to guide rollers disposed in said lower row;

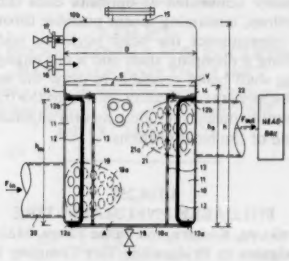
an escapement means for removing one of said rollers at a time in each of said raceways from the said folded stack; and

a first carriage mounted on each of said deployment frames and adapted for reciprocating travel thereon for transporting each of said rollers disposed in said lower row along said straight raceway.

4,116,259
DAMPING STRUCTURE IN A PIPE SYSTEM DELIVERING PULP SUSPENSION TO A HEADBOX

Jouni Koskimies, Jyvaskyla, and Erkki Ilmoniemi, Vaajakoski, both of Finland, assignors to Valmet Oy, Finland

Filed Nov. 18, 1977, Ser. No. 852,983
Claims priority, application Finland, Nov. 22, 1976, 763351
Int. Cl.[2] D21F *1/06*
U.S. Cl. 162—380 14 Claims

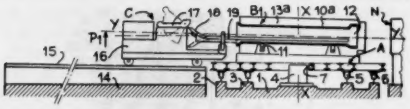


1. In an approach pipe system for delivering a pulp suspension to a headbox of a paper machine, hollow tank means having means defining in its interior an upper gas space and a lower liquid space adapted to contain a liquid which has an upper surface contacting gas in said gas space, flexible diaphragm means carried by said tank means in the interior thereof and defining with said tank means a flow space separated from said liquid space by said diaphragm means, supply pipe means communicating with said flow space in said tank means for delivering thereto pulp suspension which flows along the interior of said flow space, and discharge pipe means communicating also with said flow space of said tank means for receiving therefrom pulp suspension supplied thereto by said supply pipe means and for continuing the travel of the pulp suspension toward a headbox, whereby gas in said gas space will act through liquid in said liquid space on said diaphragm means for damping pressure and flow rate disturbances in pulp suspension flowing toward the headbox.

4,116,260
INSTALLATION FOR THE CENTRIFUGAL CASTING OF LARGE PIPES

Michel Pierrel, Pont-a-Mousson, France, assignor to Pont-A-Mousson S.A., Nancy, France

Filed Apr. 5, 1977, Ser. No. 784,878
Claims priority, application France, Apr. 13, 1976, 76 10800
Int. Cl.[2] B22D *13/10*
U.S. Cl. 164—295 **7 Claims**



1. An installation for the centrifugal casting of large heavy pipes comprising on means defining a support, a horizontal platform mounted to be rotatable about a vertical axis, two centrifugal casting machines mounted on the platform and comprising rotative moulds each of which moulds has a pipe socket-forming end, the moulds having axes of rotation which are respectively contained in a first plane and a second plane which are parallel to each other and to said vertical axis and disposed on opposite sides of said vertical axis, the two moulds being in alignment transversely of said axes of rotation of the moulds in a direction substantially perpendicular to said two planes and arranged in opposite directions on the platform symmetrically relative to said vertical axis, a first station comprising mould preparing means and pipe extracting means, a cast pipe receiving region, a second station comprising means for pouring casting metal into the moulds, a third station comprising means for mounting a core in the pipe socket-forming end of the moulds, means combined with the platform for driving the platform in rotation about said vertical axis between a first casting position and a second casting position at 180° to said first position, said first station and said casting pipe receiving region being on opposite sides of the platform and contained in a third vertical plane and said second station and said third station being on opposite sides of the platform and contained in a fourth vertical plane, said first plane and third plane being coplanar and said second plane and fourth plane being coplanar in said first position of the platform and said second plane and third plane being coplanar and said first plane and said fourth plane being coplanar in said second position of the platform, and said pipe extracting means being positioned and operative to extract the cast pipe by pushing the cast pipe through the mould toward said cast pipe receiving region.

4,116,261
CONTINUOUS CASTING PLANT STRAND GUIDING MEANS

Othmar Pühringer, and Werner Scheurecker, both of Linz, Austria, assignors to Vereinigte Österreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Dec. 13, 1976, Ser. No. 750,194
Claims priority, application Austria, Dec. 17, 1975, 9570/75
Int. Cl.[2] B22D *11/128*
U.S. Cl. 164—448 **4 Claims**

1. In a continuous casting plant strand guiding means of the type including

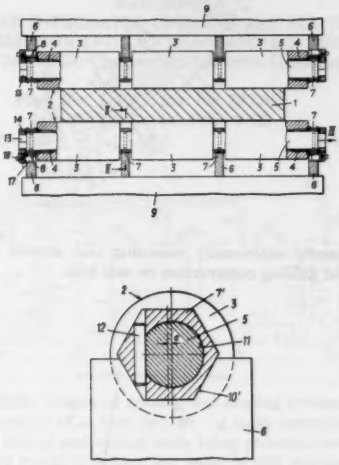
rollers arranged at a distance opposite one another to support and guide a cast strand, each roller having a plurality of roller bodies mounted on a roller shaft,

roller carriers supporting said roller shafts, and

holding means securing said roller shafts on said roller carriers so as to make them stationary, the improvement comprising:

cylindrical cross sections on the ends of the roller shafts, said ends being retained in cylindrical bores of said holding means, said holding means having projections that are attachable to projections from the roller carriers adjacent the holding means;

eccentric bushings mounting said roller shafts in said roller carriers, the eccentric bushings being formed with a prism-shaped outer configuration having a polygon-like cross section and eccentric bores to accommodate the roller shafts, the prism-shaped eccentric bushings being



received in corresponding prism-shaped receiving pockets of the roller carriers;

means securing the eccentric bushings against rotation relative to the roller shafts, the eccentric bushings being rotatable only upon release of the holding means to allow for incremental changes in the distance between rollers arranged opposite one another upon rotation of said eccentric bushings by rotation of said roller shafts.

4,116,262
ARCUATE SUPPORTING AND GUIDING CONSTRUCTION FOR CONTINUOUSLY CAST STRANDS

Franz Kagerhuber, Traun; Alois Scheinecker, and Werner Scheurecker, both of Linz, all of Austria, assignors to Vereinigte Österreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Nov. 3, 1976, Ser. No. 738,535
Claims priority, application Austria, Nov. 12, 1975, 8602/75
Int. Cl.[2] B22D *11/12*
U.S. Cl. 164—448 **12 Claims**

1. An arcuate supporting and guiding construction for a continuous casting plant having a base and producing continuously cast strands, in particular slabs, comprising:

oppositely arranged rollers forming roller paths to support the strand on opposite sides thereof;

uninterrupted arcuate longitudinal carriers extending over the entire length of the supporting and guiding construction and accommodating said rollers;

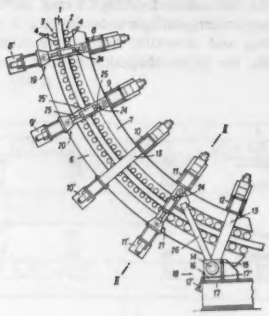
transverse carriers spaced along and being directly connected by the arcuate longitudinal carriers so as to back them up, said transverse carriers being arranged in opposing pairs;

drawing anchors connecting each opposing pair of transverse carriers;

a fixed bearing provided on one of said transverse carriers for directly mounting said one transverse carrier on the base, thereby mounting said arcuate supporting and guiding construction on the base of the plant; and

expansion bearings provided on other transverse carriers

along the arcuate supporting and guiding construction for mounting said other transverse carriers on the base,



thereby additionally mounting said arcuate supporting and guiding construction on said base.

4,116,263

MOUNTING STRUCTURE

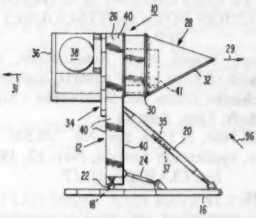
Eugene Robert Ganssle, Skillman, N.J.; Ralph Richard Scott, Claremont, Calif., and Richard Jean Williams, Marlton, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 14, 1976, Ser. No. 750,401

Claims priority, application United Kingdom, Jan. 30, 1976, 03793/76

Int. Cl.[2] G05D *23/00*

U.S. Cl. 165—27 **14 Claims**



1. A thermally stable mounting system comprising:

a thermally conductive grid-like platform having a plurality of openings extending through the platform from one side to the opposite side thereof,

a heat generating device secured to one of said sides of the platform in a given orientation, said device tending to exhibit a temperature greater in magnitude than a given value, and

temperature control means coupled to said platform and said device for maintaining said platform and device substantially isothermal at a temperature of about said given value, said control means including means for selectively radiating thermal energy to the ambient from said device at said one side through said platform openings past the other side for maintaining said device at a temperature of about said given value.

4,116,264

NUCLEAR REACTORS

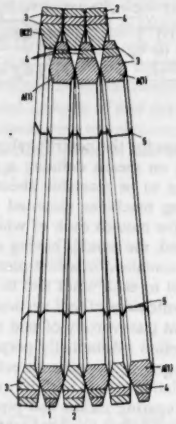
Falviano Farfaletti-Casali, Milan; Friedrich G. Peter, Ranco Uponne, and Peter G. Gritzmann, Ranco, all of Italy, assignors to European Atomic Energy Community (Euratom), Luxembourg

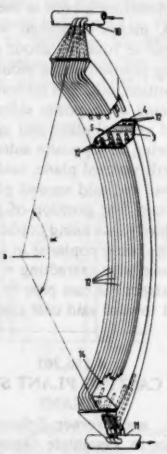
Filed Nov. 5, 1974, Ser. No. 521,143

Claims priority, application United Kingdom, Nov. 5, 1973, 51300/73

Int. Cl.[2] F21B *1/00*

U.S. Cl. 165—47 **8 Claims**



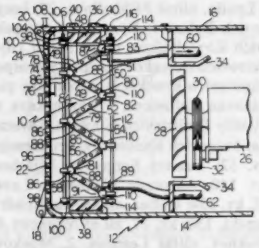


1. A hollow toroidal assembly for a reactor comprising at least two types of annular modules, said modules being tightly mounted in an alternating manner, each module being subdivided in a circumferential direction into submodules and having a uniform cross-section, said two types of modules having different cross-sections and diameters respectively, said type of module having a smaller diameter including first conically converging rims at least at the outer circumferential side of said module, and said type of module having a larger diameter including second conically converging rims at least at the inner circumferential side of said module, wherein said first and second conically converging rims of said modules in the assembly abut each other along a circular path, said circular path being displaced radially to the center of the toroidal assembly with respect to the toroidal assembly axis.

4,116,265
HEAT EXCHANGER HAVING CONTROLLABLE CLEANING MEANS

Paul J. Staebler, Dunlap, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jun. 24, 1977, Ser. No. 809,723
Int. Cl.[2] F28F *27/00*
U.S. Cl. 165—95 **7 Claims**

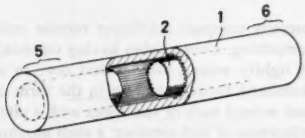


1. A heat exchanger, comprising:
at least one cooling core pair, each cooling core having first and second opposed surfaces and first and second edges;
means fixedly maintaining adjacent cores of a core pair angularly oriented and spaced one from the other, said first edges of said core pair being spaced a first preselected distance one from the other and the second edges of said core pair being spaced a second preselected distance one from the other, said first preselected distance being less than said second preselected distance; and
closure means for controllably opening and closing the space between said first edges of said core pair.

4,116,266
APPARATUS FOR HEAT TRANSFER

Shinji Sawata, Higashi-Murayama; Tatsuo Tani, Koganei; Tadayoshi Tanaka, and Takashi Horigome, both of Tanashi, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Division of Ser. No. 600,564, Jul. 31, 1975, abandoned. This application Aug. 15, 1977, Ser. No. 824,513
Claims priority, application Japan, Aug. 2, 1974, 49-88116
Int. Cl.[2] F28D *15/00*
U.S. Cl. 165—105 **3 Claims**

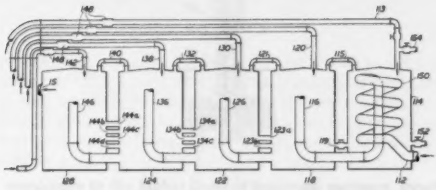


1. In an apparatus for heat transfer comprising a closed container in the shape of a pipe possessed of a heat energy input portion at one end thereof and a heat energy output portion at the other end thereof, a bundle of a multiplicity of fine metal wires disposed along the axis of said closed container extending from the input side to the output side thereof, and a heat medium sealed in said closed container, whereby the heat medium is moved in its liquid state inside the bundle through the passages formed between said multiplicity of fine metal wires from the output side to the input side by the suction due to vaporization of the heat medium on the input side, vaporized by the heat absorbed in the input portion, then moved in the vaporized state in the direction of the output side through the space formed between the bundle and the inner surface of the container by virtue of the difference of pressure created inside the closed container, and liquefied by the liberation of heat in the output portion, an improvement wherein said bundle is formed to provide passages between said multiplicity of fine metal wires having a gradually increasing cross-sectional area from the input side to the output side so that the resistance offered thereby to the flow of liquid gradually decreases in the direction from the input side to the output side.

4,116,267
MODULAR INTEGRATED COOLING AND HEATING SYSTEMS FOR EFFLUENTS AND OTHER USES

Herbert V. Jacobs, 301 Chestnut St., Apt. 1005, Harrisburg, Pa. 17101

Filed Dec. 5, 1977, Ser. No. 857,067
Int. Cl.[2] F28C *3/04*; F28B *9/00*
U.S. Cl. 165—110 **9 Claims**

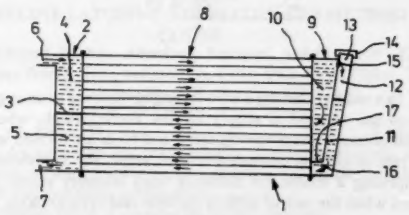


1. A modular integrated cooling and heating system comprising a plurality of at least two mi g tanks connected together, the first of said mixing tanks being provided with hot water supply means to deliver hot water to said mixing tank, cooling water supply means to deliver cooling water to said tank for direct mixing with said hot water to obtain water at a first intermediate temperature, second supply means to transport said intermediate temperature water to said second mixing tank, and second cooling water supply means to deliver water to said second mixing tank for direct mixing with said first intermediate temperature water to obtain water at a second intermediate temperature whereby said hot water is cooled by direct mixing with said cooling water to avoid the necessity of evaporative cooling towers.

4,116,268
WATER TANK FOR TRANSVERSE FLOW RADIATOR

Hermann Krüger, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Oct. 1, 1976, Ser. No. 728,877
Claims priority, application Fed. Rep. of Germany, Oct. 10, 1975, 2445458; Jun. 24, 1976, 2628331
Int. Cl.[2] F28B *9/10*; F28F *9/02*
U.S. Cl. 165—111 **12 Claims**



1. In a water tank for a transverse flow radiator including an overflow chamber separated from a main water coolant stream collecting chamber by means of a substantially vertical partition, means for permitting a secondary stream of coolant to flow through said overflow chamber, and a fill inlet opening into said overflow chamber and adapted to be closed by a pressure relief valve, the improvement wherein said water tank

is made in one piece as a cast or die-cast member; said overflow chamber is disposed coaxially below said fill inlet; and said overflow chamber has a cross-sectional area which is equal to or less than that of said fill inlet.

4,116,269

ENGINE RADIATOR WITH MEANS FOR NOISE REDUCTION

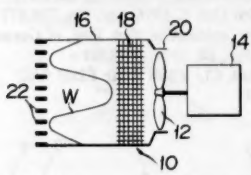
Hiromichi Ikeda, Tokyo, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Apr. 27, 1976, Ser. No. 680,699

Claims priority, application Japan, Apr. 28, 1975, 50-056834[U]; Sep. 30, 1975, 50-132855[U]; Sep. 30, 1975, 50-132856[U]

Int. Cl.[2] E04B *1/99*; B60K *11/00*; F01P *7/00*

U.S. Cl. 165—126 **1 Claim**



1. In a radiator having a core arranged opposite to an engine-driven fan adapted to supply airflow therethrough, wherein sound pressure waves having crests and roots are formed when the rate of airflow exceeds a critical value, the improvement comprising a means for reducing high intensity sound produced when the rate of airflow exceeds said critical value, said means comprising a plurality of fixedly mounted baffle plates, said baffle plates being positioned downstream in straight-line adjacency parallel with the airflow through said core, said baffle plates being spaced apart from each other in a direction at right angles to the direction of the airflow through said core, the positioning of said plates corresponding to the location of said crests and roots, wherein resonance of said core is minimized when the airflow through said core exceeds said critical value.

4,116,270

TUBULAR COILED HEAT EXCHANGER AND DEVICE FOR MANUFACTURING SAME

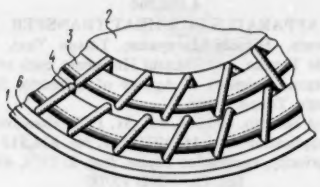
Ruf Fedorovich Marushkin, ulitsa Miklukho-Maklaya 33, kv. 33; Jury Ivanovich Zelenov, 10 Parkovaya ulitsa, 4, kv. 14; Nikolai Alexandrovich Kozlov, ulitsa Usacheva, 29, kv. 521; Nikolai Prokopievich Filin, Trekhgorny val, 24, kv. 54; Iosif Isaakovich Gurevich, Strastnoi bulvar, 13a, kv. 66; Vladimir Vasilievich Usanov, Novodevichy proezd, 2, kv. 5; Oxana Kirillovna Krasnikova, ulitsa Udaltsova, 4, kv. 127; Vladimir Nikolaevich Lyalin, ulitsa Mikhailova, 29, korpus 3, kv. 103; Viktor Ivanovich Bykasov, Ryazansky prospekt, 53, kv. 41; Felix Petrovich Kirpichnikov, ulitsa Marii Ulyanovoi, 6, kv. 40; Viktor Petrovich Belyakov, Leninsky prospekt, 90, kv. 60; Vladimir Grigorievich Pronko, B. Kozlovsky pereulok,11, kv. 42; Vera Ivanovna Epifanova, Frunzenskaya naberezhnaya, 36, kv. 251; Vasily Dmitrievich Nikitkin, Tsvetnoi, bulvar, 25, kv. 95; Zakhar Ivanovich Kandaurov, Frunzenskaya naberezhnaya, 16, kv. 52; Tamara Sergeevna Mischenko, prospekt Mira, 85, kv. 110; Alexandr Alexeevich Lavrentiev, Frunzensky val, 2, kv. 154; Galina Alexeevna Kondratieva, Volgogradsky prospekt, 130, kv. 27, all of Moscow; Alexandr Mikhailovich Orekhov, ulitsa Lesnaya, 2, Moskovskaya oblast, Schelkovsky raion, poselok Sverdlovsky; Evgeny Valentinovich Onosovsky, ulitsa Z.i A. Kosmodemyanskikh, 8/7, kv. 131, Moscow; Elvin Konstantinovich Kalinin, Schelkovsky proezd, 11, korpus 1, kv. 73, Moscow; Genrikh Alexandrovich Dreitser, ulitsa Shvernika, 6, korpus 2, kv. 35, Moscow; Dmitry Arkadievich Kirikov, Izmailovsky bulvar, 12, kv. 24, Moscow, and Boris Alexandrovich Chernyshev, Seleznevskaya ulitsa, 40, kv. 10, Moscow, all of U.S.S.R.

Filed Feb. 23, 1976, Ser. No. 660,268

Claims priority, application U.S.S.R., Jul. 30, 1975, 2153901

Int. Cl.[2] F28D *7/02*; F28F *1/36, 1/22*

U.S. Cl. 165—162 **3 Claims**

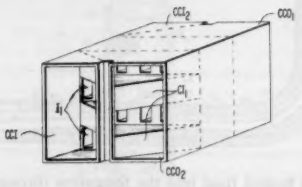


1. A generally compact multilayer tubular coiled heat exchanger comprising: a core; tubes having essentially the same length and tightly wound around said core in at least two layers; streamlined finned members in the form of wire rods being wound around each of said tubes with a pitch of at least twice the thickness of said member; a shell mounted coaxially with said core and encompassing it; said tubes are adapted to pass a fluid therealong and therebetween in a space defined by said shell and said core, said tubes being wound around said core to form coils, so that the distances between the centers of the cross-section of tube coils in one layer and between the centers of the cross-sections of the same tube coils of said layer gradually vary from a value equal to the sum of the diameter of one of said tubes plus twice the height of a wire rod fin to a value equal to the sum of the diameter of said tube plus a single height of the wire rod fin, the above distance relationship periodically repeating over the entire length and cross-section of the heat exchanger; wherein the finned wire rod surfaces of each tube coil alternately contacts the finned wire rod surfaces and the tube surface of the adjacent tube coils and wherein the number of turns in the layers of a multilayer tubular coiled heat exchanger can be varied without the need for structure distant pieces between the tube layers.

4,116,271
COUNTER-CURRENT BUMPED PLATES HEAT EXCHANGER

Guido Amandus De Lepeleire, Waverse baan, 178, B-3030 Heverlee, Belgium

Continuation of Ser. No. 547,068, Feb. 4, 1975, abandoned. This application Sep. 15, 1976, Ser. No. 723,368
Int. Cl.[2] F28F 3/00
U.S. Cl. 165—166 2 Claims



1. A counter current heat exchanger comprising a plurality of spaced apart parallel plates having spacer means therebetween for separating said plates and for spreading the flow of fluid between said plates over the entire surface area of said plates, housing means completely closing the spaces between said plates along two opposed sides of said plates, said housing means defining a plurality of rows of spaced apertures between said plates along the other two opposed sides of said plates with the apertures in alternate rows being offset from each other, primary inlet and outlet collector means secured to said housing means and co-extensive with the sides of said housing means having said apertures, each of said collector means comprised of the one-piece zig-zag shaped wall member with adjacent portions of said wall member being disposed at right angles to each other so that alternate portions of said wall members are parallel to each other, said parallel wall portions having identical triangular configurations disposed perpendicular to said plates between said apertures so that alternate spaces between said triangular plates communicate with the apertures in alternate rows and secondary inlet and outlet collector means being comprised of wall means surrounding said primary collector means and disposed perpendicular to said apertured sides of said housing means, each of said secondary collector means in conjunction with each primary collector means defining two plenum chambers each having a triangular cross-section on opposite sides of said primary collector means.

4,116,272
SUBSEA TEST TREE FOR OIL WELLS

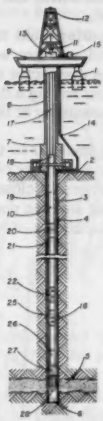
Burchus Q. Barrington, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Jun. 21, 1977, Ser. No. 808,491
Int. Cl.[2] E21B 33/035, 43/12
U.S. Cl. 166—340 39 Claims

9. A method of controlling a valve in the flow passageway of a blowout preventer stack located on a sea floor over an oil well comprising:

closing a set of rams in the blowout preventer stack for setting a reference pressure for maintaining the valve in a normal first condition;

applying hydraulic pressure to one side of said closed rams for raising the hydraulic pressure on said one side of said closed rams to a level higher than said reference pressure; and

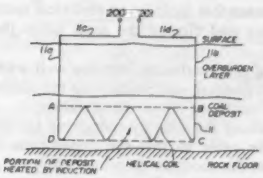


responsive to the higher level of hydraulic pressure, moving said valve from said first position to said second position.

4,116,273
INDUCTION HEATING OF COAL IN SITU

Sidney T. Fisher, 2850 Hill Park Rd., and Charles B. Fisher, 53 Morrison Ave., both of Montreal, Quebec, Canada

Filed Jul. 29, 1976, Ser. No. 709,830
Int. Cl.[2] E21B 43/24; E21C 41/10
U.S. Cl. 166—248 16 Claims



1. A method for heating a selected portion of an underground deposit of coal which comprises the step of directly heating said selected portion by electrical induction heating.

4,116,274
WIRELINE LATCHING APPARATUS AND METHOD OF USE

E. Edward Rankin, Aberdeen, Scotland, and David W. King, Fort Worth, Tex., assignors to Petro-Data C.A., Dallas, Tex.

Filed Jul. 25, 1977, Ser. No. 818,424
Int. Cl.[2] E21B 47/06, 23/02
U.S. Cl. 166—250 8 Claims

1. An apparatus for preventing a wireline instrument from moving upward in pipe while measuring fluid flow conditions in oil and gas wells comprising:

a tubular body connected to the instrument;

an arm pivotally carried at its lower end by the tubular body, the upper end of the arm being movable between a closed position and an open position to engage the underside of a shoulder in the pipe, the arm being structured so as to allow fluid to flow past while in the open position; and

actuating means for moving the arm between the open and closed positions; the actuating means being electrically powered;

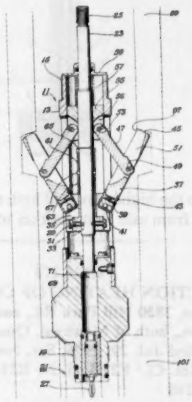
the actuating means and arm interconnected so that tension

in the line may be transmitted though the arm to draw it tightly against the shoulder, thereby preventing upward movement of the instrument and whipping of the wireline due to flowing fluid.

7. A method of measuring fluid temperature and pressure downhole in flowing oil and gas wells with an instrument lowered into the well on conductor cable, comprising:

placing a landing means having a downwardly facing shoulder in the well substantially at the depth where measurements are desired;

connecting a latching member to the instrument, the latching member having a plurality of arms whose upper ends selectively pivot between a closed position flush with the latching member and an open position protruding upward and outward; the latching member further having actuating means that includes an electrical motor for selectively opening and closing the arms when the motor is energized;



lowering the instrument into the well with the arms in the closed position and positioning the instrument so that the upper arms are below the shoulder;

then opening the arms by energizing the motor and tensioning the cable so that the upper ends of the arms bear against the shoulder to prevent upward movement;

then sensing the temperature and pressure as the fluid flows around the instrument, concurrently receiving an indication at the surface; and

closing the arms by energizing the motor after measuring is completed and then removing the instrument from the well.

4,116,275

RECOVERY OF HYDROCARBONS BY IN SITU THERMAL EXTRACTION

Roger Moore Butler; Caurino Cesar Bombardieri, and Bruce Alexander Slevinsky, all of Calgary, Canada, assignors to Exxon Production Research Company, Houston, Tex.

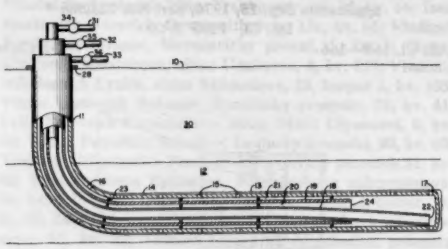
Filed Mar. 14, 1977, Ser. No. 777,292
Int. Cl.[2] E21B *43/24*
U.S. Cl. 166—303 **22 Claims**

1. A method for recovering hydrocarbons from a subterranean formation containing viscous hydrocarbons comprising,

drilling a well to said formation and extending the well into said formation;

completing the well with a casing means and with dual concentric tubing strings comprising an inner tubing and a larger diameter outer tubing, the inner tubing forming a first flow path, the inner tubing cooperating with the outer tubing to form a second flow path, and the outer tubing cooperating with the a second flow path, and the outer tubing cooperating with the casing means to form a third flow path, said casing means extending substantially the length of said well and containing passages to allow formation hydrocarbons to enter said casing means;

circulating a heated fluid within the casing means until flow of said heated fluid is established in each of said flow paths;



injecting heated fluid into the formation through at least a portion of said third flow path after flow of said heated fluid has been established by circulation within said casing means;

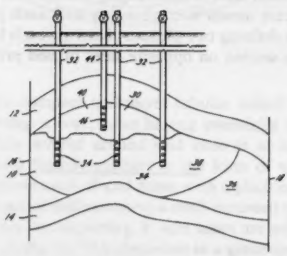
producing formation hydrocarbons from the formation by means of the well.

4,116,276

METHOD FOR INCREASING THE RECOVERY OF NATURAL GAS FROM A GEO-PRESSURED AQUIFER

Harold L. Cook, Jr.; Ernest C. Geer, both of Houston, Tex., and Donald L. Katz, Ann Arbor, Mich., assignors to Transco Energy Company, Houston, Tex.

Continuation-in-part of Ser. No. 689,621, May 24, 1976, Pat. No. 4,040,487, which is a continuation-in-part of Ser. No. 589,240, Jun. 23, 1975, abandoned. This application Jun. 16, 1977, Ser. No. 807,275
Int. Cl.[2] E21B *43/00*
U.S. Cl. 166—314 **7 Claims**



1. A method of increasing the recovery of natural gas from a geo-pressured aquifer having a trap in the aquifer and containing water and gas in solution in the water comprising,

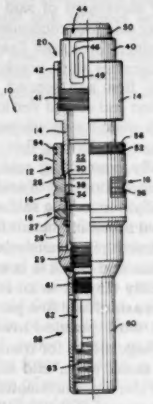
producing water, from one or more wells extending from the surface and completed in said geo-pressured aquifer at a point below and spaced from the trap, by reservoir pressure at a high enough rate of production to reduce the pressure of a portion of the aquifer to allow a portion of the gas in solution to be released from the water whereby some of the released gas will migrate upwardly to form a free-gas phase in the trap and a portion of released gas will be produced from said one or more wells, and

thereafter producing gas from one or more wells extending from the surface to the free-gas phase in the trap.

4,116,277
FULL FLOW TUBING PLUG WITH LOCKED ANCHOR AND METHOD

John K. McGee, and Charles D. Bridges, both of Houston, Tex., assignors to Gray Tool Company, Houston, Tex.

Filed Apr. 12, 1977, Ser. No. 786,934
Int. Cl.[2] E21B 23/02
U.S. Cl. 166—315 26 Claims



17. A method of locking a down-hole member in place, comprising the steps of

(a) lowering the down-hole member into a tubing hanger or the like with a running tool, to a desired down-hole position,

(b) activating a structure for holding said down-hole member in place in the tubing hanger or the like at said desired position by actuation of said running tool in a first mode,

(c) locking said structure for holding said down-hole member in place in the well casing in its holding position by actuation of said running tool in a second mode different from said first mode,

(d) effecting removal of a running tool from the tubing hanger or the like only after the locking of the holding structure for the down-hole member is effected,

(e) removing said down-hole member from position within the tubing hanger or the like by actuation of a tool in a third mode different from said first and second modes to simultaneously release locking of said holding structure in said holding position and release holding of said holding structure in said holding position, and

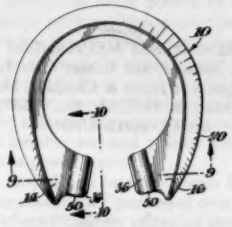
(f) subsequently removing said down-hole member with said running tool.

4,116,278
HORSESHOE MANUFACTURE

Dudley W. C. Spencer, 619 Shipley Rd., Wilmington, Del. 19809

Continuation-in-part of Ser. No. 673,371, Apr. 5, 1976, Pat. No. 4,036,302, which is a continuation-in-part of Ser. No. 614,766, Sep. 18, 1975, Pat. No. 4,013,126. This application Jan. 26, 1977, Ser. No. 762,394
Int. Cl.[2] A01L 5/00
U.S. Cl. 168—4 16 Claims

1. A horseshoe comprising a U-shaped body member terminating in a pair of free ends, said body member being made of resilient material capable of being distorted out of its normal undistorted condition, said body member having an outer edge and an inner edge with a generally planar upper surface therebetween, said upper surface being adapted to be adhesively secured to the hoof, an upstanding rim along said outer edge extending inwardly and upwardly toward said inner edge, an upstanding projection at said inner edge at each of said free ends opposite a portion of said rim, each of said projections extending upwardly above said planar surface for fitting in corresponding pockets in the hoof, each of said projections having an inner wall disposed remote from the portion of said rim on its free end and adjacent the space between said free ends, each of said projections having an outer wall between its inner wall and the portion of said rim on its free end, each of

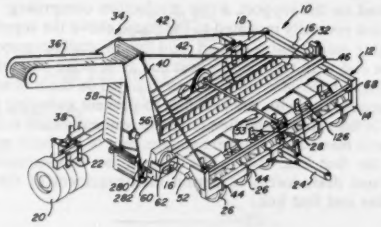


said outer walls being inclined from said planar surface upwardly and outwardly away from the portion of said rim at its free end, and said projections being connected to each other solely by their common mounting on said resilient body member whereby the spacing between said projections is determined by the location of the pockets in the hoof.

4,116,279
HYDRAULIC BEET HARVESTER

Ronald Lee Kilburn, Denver, Colo., assignor to H.F.E., Inc., Ft. Collins, Colo.

Continuation-in-part of Ser. No. 647,593, Jan. 8, 1976, abandoned. This application Apr. 20, 1977, Ser. No. 789,077
Int. Cl.[2] A01D 19/02
U.S. Cl. 171—58 18 Claims



1. In a beet harvesting machine having a rectangular frame with longitudinal and transverse support beams and a front yoke, said machine being pulled at said yoke by a tractor for harvesting and delivering beets into a truck having means located on said frame for digging beets upwardly from the ground, means located on said frame operative on said dug beets for flailing said beets rearwardly, means located on said frame receptive of said rearwardly directed beets for conveying said beets further rearwardly in said machine, means located on said frame receptive of said rearwardly conveyed beets for delivering said beets laterally in said machine, and means located on said frame receptive of said laterally delivered beets for elevating said beets into said truck, the improvement to said machine comprising:

a reservoir disposed in the interior of one of said beams and substantially coextensive therewith for containing hydraulic fluid,

first means, in fluid communication with said reservoir and cooperative with the power-take-off of said tractor, for pumping a first portion of said fluid from said reservoir to drive said elevating means,

second means, in fluid communication with said reservoir and cooperative with the power-take-off of said tractor, for pumping a second portion of said fluid from said reser-

voir to drive said flailing means and said conveying means, and

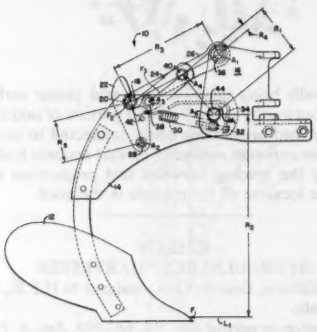
third means, in fluid communication with said reservoir and cooperative with the power-take-off of said tractor, for pumping a third portion of said fluid from said reservoir to drive said delivering means.

4,116,280

SPRING RESET MECHANISM

Gary Allen Rehn, Andover, and Robert Otto Taube, Moline, both of Ill., assignors to Deere & Company, Moline, Ill.

Filed Mar. 18, 1977, Ser. No. 778,975
Int. Cl.[2] A01B *61/04*
U.S. Cl. 172—266 **12 Claims**



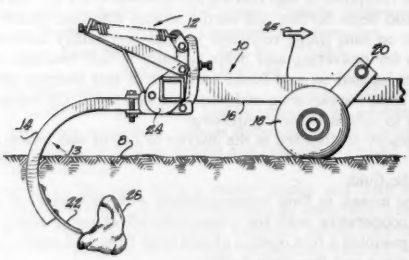
1. In an earthworking implement having a supporting frame, a tool support pivotally carried by the frame for swinging movement about a horizontal axis, an earthworking tool mounted on the support, a trip mechanism comprising: a first rigid link pivotally mounted to the frame above the support for swinging movement; a second rigid link pivotally connected at its one end with the tool support and at its other end with the first link; a releasable latch member carried on the tool support and engageable with the first link to prevent swinging movement of the support and first link; and resilient means acting on the latch member to maintain engagement of the latch member with the first link, but yieldable upon the tool encountering abnormal draft forces to permit disengagement of the latch member and first link.

4,116,281

FAST CLAMP CHISEL TRIP

Lawrence L. Lant, Evansville, Ind., assignor to Chem-Farm Inc., Evansville, Ind.

Filed Dec. 20, 1976, Ser. No. 752,679
Int. Cl.[2] A01B *61/04*
U.S. Cl. 172—267 **5 Claims**



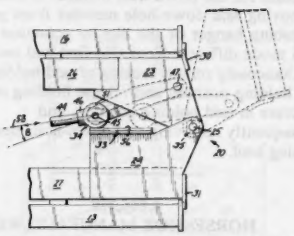
1. A fast clamp chisel trip apparatus for use with a chisel plow having a frame, a plowing tool including a shank, and means pivotally connecting said shank to said frame, said apparatus comprising rigid mounting means fixed to said frame, a shank plate having first and second ends, means rigidly connecting said first end of said shank plate to said shank, first pin means pivotally connecting said first end of said shank plate to said mounting means for movement of said shank between a work position and a retracted position, linkage means connected to said second end of said shank plate and said frame for releasably holding said shank in said work position and for permitting movement of said shank to said retracted position whenever said tool encounters a resisting force greater than a predetermined force, said linkage means including a generally vertical member and a breakover member, said vertical member having first and second ends, second pin means connecting said first end of said vertical member to said second end of said shank plate for movement in unison therewith, said breakover member having first and second ends, third pin means pivotally connecting said first end of said breakover member to said second end of said vertical member, fourth pin means pivotally connecting said second end of said breakover member to said mounting means for locating axes of said second, third and fourth pin means substantially adjacent to an imaginary line when said shank is in said work position, said line being substantially tangent to an arc of movement of said second pin about the axis of said first pin during movement of said shank from said work position toward said retracted position to align said linkage means for transmitting said resisting force through said shank plate, said second pin and said vertical member to said third pin substantially along said line whereby said breakover member substantially locks said shank in the work position until said predetermined resisting force is exceeded, and a tension member connected between said linkage means and said frame for yieldably biasing said linkage means and said shank from the retracted position to the work position.

4,116,282

AGRICULTURAL IMPLEMENT WITH WING LIFT

Loren F. Hansen, Lincoln, Nebr., assignor to Hiniker Company, Mankato, Minn.

Filed Oct. 18, 1976, Ser. No. 733,414
Int. Cl.[2] A01B *73/00*
U.S. Cl. 172—311 **1 Claim**



1. In a farm implement comprising a central body and a lateral wing hinged thereto for movement through substantially 180° about a first horizontal axis between a first position, in which said wing lies inverted upon said central body, and a second position, in which said wing lies as an extension of said body, the improvement which comprises:

a. a link having a first end pivotally connected to said wing for rotation about a second axis parallel to and displaced from said first axis,

b. stop means carried by said wing for lateral engagement by said link at a location between its ends at a point in the pivotal movement of said link,

c. roller means carried at the second end of said link for rotation about a third axis parallel to said first axis,

d. a hydraulic cylinder, pivoted at one end to said body about a fourth axis parallel to said first axis and having an

actuator pivoted at the other end to said second end of said link for rotation about said third axis, whereby to apply force, to said second end of said link along a line passing perpendicularly through said third axis, to first bring said link into engagement with said stop means and then cause rotation of said wing about said first axis,

e. and horizontal plane track means carried by the central body, said track means spaced lower than said first axis and incurring only downward engagement by said roller means after said link engages said stop means, so that continued application of said force thereafter continues the rotation of said wing and causes rolling movement of said roller means along said track means, and simultaneously causes displacement between said stop means and said link,

f. said first, second, third and fourth axes being so positioned with respect to each each other and with respect to said plane track means that whenever said wing moves from said second position to said first position, said roller means first makes contact with said plane track means adjacent one each thereof and is then displaced to the opposite end of said plane track means and that during such displacement, said second axis moves steadily away from the line of action of said actuator up to and including the time said wing reaches said first position, said second axis being on the opposite side of said line from said plane track means whenever said roller means engages said plane track means, whereby force acting in a vertical plane through the line of action of said actuator has no component away from the plane of said track.

4,116,283

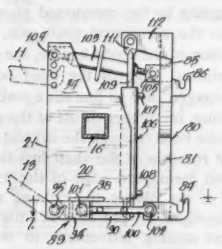
AGRICULTURAL TILLAGE EQUIPMENT

John B. Blessent, R.R. #1, Urbana, Ill. 61801

Continuation-in-part of Ser. No. 588,070, Jun. 18, 1975, abandoned. This application Nov. 26, 1976, Ser. No. 745,301

Int. Cl.[2] A01B *59/043*

U.S. Cl. 172—443 **4 Claims**



1. Tillage equipment for use with agricultural wheel tractors equipped with a three-point, free-link, power lift hitch, comprising:

a tillage tool bar to extend laterally of the tractor,

a central main frame supporting said bar,

said frame having a pair of upright parallel plates spaced apart substantially at lower hitch point spread and extending front to rear relative to a tractor,

a central mast box section above the plates at upper hitch point height and

rigid framing connecting said upright plates and mast section,

said tool bar extending through said upright plates below said mast and being rigidly supported therein,

means respectively forming lower tractor link hitch pin connections at the lower front portions of said plates and a tractor upper link pin connection in said mast,

a rigid cross member joining the lower rearward portion of said upright plates,

an upright quick-attaching coupler tandem mounted closely to the rear of said main frame, said coupler having a pair of spaced frame parts joined to a central upright mast, hook bracket means carried adjacent the bottom of each of said frame parts and by said coupler mast extending rearwardly therefrom and spaced apart at a standard spacing for attaching connecting means of a tilling tool implement to be hitched to said coupler,

said mounting including a pair of draft links respectively pivotally joining the lower portion of each plate to the adjacent lower portion of the coupler parts and an adjustable length top link pivotally joining said mast section to the upper portion of the coupler, said link pivots being generally horizontally oriented providing upright swinging of the coupler about said link pivots to the main frame,

an upright lift cylinder device pivotally connected between said cross member and said coupler with hydraulic connections to a power source,

said coupler central mast having an upper forwardly extending attachment member positioned over said cross member and a lower forwardly extending attachment member, said attachment members being offset from each other on opposite lateral sides of said coupler central mast with said upper attachment member placed above the lower attachment member,

said cylinder device being connected to the upper attachment member and said adjustable link being connected to the lower attachment member so that said link and cylinder member may lift upon said coupler at a point above the upper pivot point of the coupler on said top link with said cylinder device remaining substantially upright,

whereby said coupler may be raised and lowered relative to said main frame for adjustable positioning tilling tools hitched to the coupler relative to tilling tools on said tool bar while providing for conjoint elevation and lowering of both main frame and quick-coupler by the tractor power lift hitch.

4,116,284

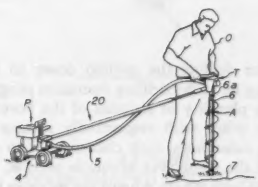
EARTH DRILLS

Van R. Cox, P.O. Box 840, Livingston, Tex. 77351

Filed Jun. 10, 1977, Ser. No. 805,295

Int. Cl.[2] E21B *3/02*

U.S. Cl. 173—140 **1 Claim**



1. A manually held earth auger arrangement including:

a. a power source mounted on wheels for moving over the earth's surface;

b. a flexible drive shaft connected to said power source;

c. a transmission connected to said drive shaft;

d. an auger removably connected to said transmission;

e. handle means secured to said transmission to manually position said auger in a desired position relative to the earth's surface for penetration therein;

f. throttle means on said handle for controlling said power source;

g. torque control means secured to said power source and extending to said transmission means to inhibit rotation of said handle means when said auger is rotated by said power source, said torque control means including:

1. first longitudinally extending socket means pivotally supported on said power source;

2. second longitudinally extending socket means pivotally supported on said handle means;

3. nonflexible shaft means for connecting to and extending between said first and second socket means, said shaft means including:

a first member having means extending longitudinally from the end thereof to telescopically engage said first longitudinally extending socket means;

a second member telescopically received in said first member and having means extending longitudinally from the end thererof to telescopically engage said second longitudinally extending socket means; and

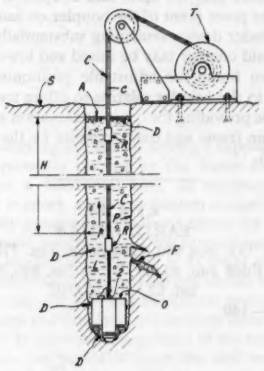
h. spring loaded plunger means carried by each of said first and second longitudinally extending socket means engageable respectively with said first and second members to releasably secure said first and second members to said first and second socket means.

4,116,285

PROCESS AND APPARATUS FOR PRODUCING DEEP BOREHOLES

Paul Leon Guerber, Drancy, France, assignor to Coyne & Bellier, Bureau d'ingenieurs Conseils, Paris, France

Filed Dec. 10, 1976, Ser. No. 749,833
Claims priority, application France, Jun. 18, 1976, 76 18585
Int. Cl.[2] C09K *7/00;* **E21C** *7/06*
U.S. Cl. 175—7 **8 Claims**



1. Process for drilling the ground down to a very great depth, consisting in, as the drilling operation progresses downwards, filling a plurality of sections of the borehole situated one above the other with respectively a same plurality of different filling substances, each chosen so as to remain liquid at all points of the respective borehole section, while taking into account the laws which govern the increase in the ground temperature and the increase in pressure with increasing depth, and having a density greater than the average density of the drilled ground strata, so that debris and any possible infiltrations in said borehole move naturally up to the free surface of the liquid filling said borehole.

4,116,286

PROBE

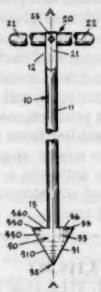
Clayton W. Bash, P.O. Box 111, Forest, Ohio 45843

Filed Mar. 31, 1977, Ser. No. 783,150
Int. Cl.[2] E01N *33/24;* **E21C** *13/00*
U.S. Cl. 175—19 **2 Claims**

1. In a probe for locating buried plastic field tile, having the combination of an elongate shaft, a handle in engagement with one end of the shaft for imparting thrust and torque to the shaft, and a head in engagement with the other end of the shaft characterized by being

a substantially lamellate body of a thickness equal in dimension to one of a dimension that is less than and another that is equal to a transverse dimension of the shaft, the body extending from the shaft end in a plane, which, when the body is viewed edgewise, is between two substantially parallel spaced lines, each on opposite sides of and parallel to the major longitudinal axis of the shaft and substantially coincidental with opposite lateral surfaces of the shaft, and when the body is viewed in plan from a point substantially 90° about the shaft major longitudinal axis from the point of mentioned edgewise view, extends laterally between and from one to the other of a second two substantially parallel spaced lines on opposite sides of an parallel to the major longitudinal axis of the shaft, one of which lines is spaced a greater distance from the major longitudinal axis of the shaft than the distance bwtween such axis and each of the first mentioned two lines;

the body having an end edge in spaced relation to the handle and of less thickness than the body extending linearly



substantially in the mentioned plane at an acute angle to the major longitudinal axis of the shaft and a second edge closer to the handle than the first mentioned edge and being of a thickness substantially equal to that of the body and extending in the mentioned plane and substantially normal to the mentioned shaft axis, whereby, through manipulation of the probe handle, the shaft may move the first mentioned edge of the head body to engage and having engaged then to line slit a wall of a sought plastic tile allowing, on further thrust of the probe shaft, passage of the probe head through the slit and into the tile interior and upon rotation of the shaft less than 180°, to dispose the second mentioned edge of the body to engage wall portions of the plastic tile on one side of the slit and thereby to signal the presence of a tile by the resistance to subsequent testing movement to withdraw the probe shaft.

4,116,287

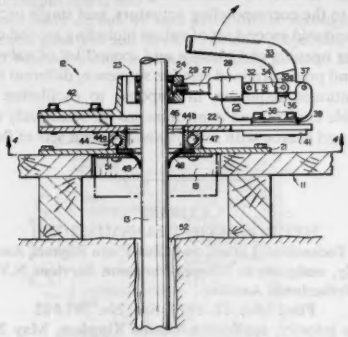
WELL DRILLING ASSEMBLY AND METHOD

Howard E. Foster, 932 St. Joseph Ave., Los Altos, Calif. 94022

Filed Jun. 23, 1977, Ser. No. 809,182
Int. Cl.[2] E21B *21/00*
U.S. Cl. 175—65 **6 Claims**

5. A method of drilling a well through an access opening in a drill platform using a hand-held rotational power source for rotating drill stem sections coupled in tandem comprising the steps of coupling the power source to the upper end of a first section of drill stem, rotating said first section while supplying liquid under pressure therethrough to drill said first section into the ground, lifting said first section upwardly spaced from the bottom of the drilled hole, applying a clamp carried by the

platform to grip said first section for holding said section in its lifted position, rotating said clamp and section together while



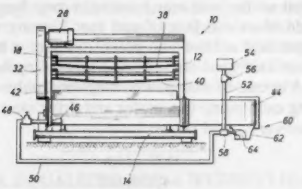
supported by the platform, and supplying liquid via said section to flush the drilled hole.

4,116,288

METHOD AND APPARATUS FOR CONTINUOUSLY SEPARATING LOST CIRCULATING MATERIAL FROM DRILLING FLUID

William W. Love, Houston, Tex., assignor to The Brandt Company, Houston, Tex.

Filed Apr. 18, 1977, Ser. No. 788,626
Int. Cl.² E21B *21/00*
U.S. Cl. 175—66 **13 Claims**



1. A method of drilling well bores in formations having the characteristic of causing loss of circulating drilling fluid into the formation being drilled, said method comprising the steps of:

(a) providing drilling fluid and circulating the same in said well bore;

(b) continuously introducing lost circulation material into said circulating drilling fluid and circulating said lost circulation material along with said drilling fluid;

(c) continuously separating said lost circulation material from the drilling fluid containing undesirable particulate matter and lost circulation material exiting the well bore;

(d) subsequent to step (c), continuously separating at least a majority of the undesirable particulate matter from said drilling fluid to produce cleaned drilling fluid;

(e) reintroducing said lost circulating material into said cleaned drilling fluid; and

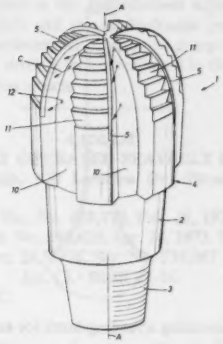
(f) continuing with circulation of said drilling fluid and lost circulation material in the well bore being drilled.

4,116,289

ROTARY BIT WITH RIDGES

Robijn Feenstra, Rijswijk, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Sep. 23, 1977, Ser. No. 836,259
Int. Cl.² E21B *9/36*
U.S. Cl. 175—329 **6 Claims**



1. Rotary bit for drilling a hole in a subsurface formation, said bit comprising a body with central axis, a plurality of mud flow channels arranged in the outer surface of the body, said channels substantially extending from a place near the central axis to body portions having the largest radius with respect to the central axis, scraping means mounted on the body and having scraping edges for drilling a hole in a subsurface formation, said scraping means extending in a single row along one side of each channel and lining at least part of the wall of each channel, and ridge-shaped elements on the outer surface of the body, the elements being abrasive-resistant, being provided with nonscraping ridges that are located within the rotationally symmetric surface defined by the scraping edges of the scraping means, said ridges substantially extending along circles concentric to the central axis, and having flanks that are positioned at an acute angle with respect to the said symmetric surface.

4,116,290

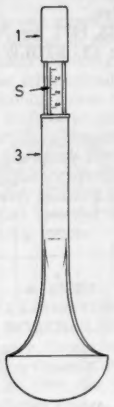
SPOON-SHAPED SPRING SCALE

Avraham Fishman, Klosbachstr. 101, CH-8032 Zurich, Switzerland

Filed Feb. 25, 1977, Ser. No. 772,284
Claims priority, application Fed. Rep. of Germany, Aug. 24, 1976, 2637972
Int. Cl.² G01G *3/02, 19/56*
U.S. Cl. 177—149 **6 Claims**

1. A spoon-shaped spring scale comprising a tube-shaped hollow handle merging into the bowl of a spoon, a tube-shaped movable calibrated scale member slidingly arranged within said handle the outer end of said movable scale member having suspension means, a tension spring being located inside said movable scale member and said hollow handle one end of said spring being secured to said movable scale member the other end of said spring being secured to said hollow handle, said hollow handle having an inside projection engagable with a separate slide-in spring securement part to which the end of said spring secured to said hollow handle is fastened, said spring securement part being pushed into said hollow handle until it passes said projection where it is held by irreversible

engagement with said projection and the upper edge of said hollow handle providing the outer housing for the scale with



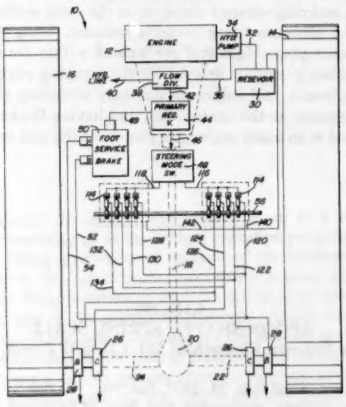
its upper rim providing a reading mark for said calibrated scale member.

4,116,291

INTEGRATED STEERING CONTROL FOR TRACKED VEHICLES

Nelson D. Brungart, 3001 Old Hayneville Rd., Montgomery, Ala. 36108

Filed Jul. 18, 1977, Ser. No. 816,906
Int. Cl.[2] B62D *11/08*
U.S. Cl. 180—6.2 **6 Claims**



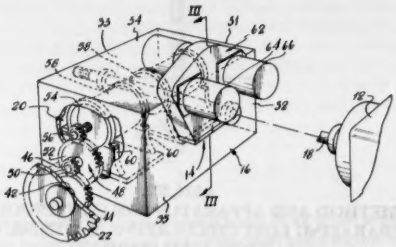
1. In combination with a crawler tracked vehicle of the type including right and left crawler tracks, a prime mover drivingly connected to said crawler tracks through a differential and with separate right and left clutch and brake mechanisms interposed in the drive train for said tracks intermediate said differential and tracks, a single oscillatable control, a set of fluid pressure actuators for said clutch and brake mechanisms, a source of fluid under pressure, a first set of fluid flow means communicating said source of fluid pressure with each of said actuators, independently, and a set of valves operatively associated with said set of fluid flow means for selectively controlling the flow of fluid therethrough to the corresponding actuators, said single oscillatable control and said first set of valves including first coacting means for opening and closing said valves in first predetermined opening and closing sequence in response to oscillation of said oscillatable control, a second set of fluid flow means communicating said source of fluid pressure with each of said actuators, independently, a second set of valves operatively associated with said second set of fluid flow means for selectively controlling the flow of fluid therethrough to the corresponding actuators, said single oscillatable control and said second set of valves including second coacting means for opening and closing said second set of valve means in a second predetermined relative sequence, different from the first mentioned sequence, in response to oscillation of said oscillatable control, and control means for selectively communicating said source with said first and second sets of fluid flow means.

4,116,292

HYDROSTATIC TRANSMISSIONS

Eugenio Todeschini, Latina, and Gian Piero Riganti, Anzio, both of Italy, assignors to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

Filed May 17, 1977, Ser. No. 797,663
Claims priority, application United Kingdom, May 20, 1976, 20823/76
Int. Cl.[2] B62D *11/06*
U.S. Cl. 180—6.48 **3 Claims**



1. A crawler vehicle having a pair of tracks for propelling said vehicle, a rear housing, a drive assembly associated with each track and connected to opposite side members of said rear housing, a hydraulic motor connected to each drive assembly and located within said rear housing, a gear box mounted on the outside of an end face of said rear housing and having a power input and at least two power outputs, a pair of pumps mounted on said gear box external thereof each respectively connected to one of said power outputs, fluid conduit means connecting each pump to a motor and drive means connecting a prime mover to said power input.

4,116,293

DRIVING MECHANISM

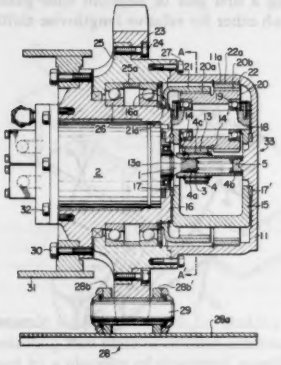
Kiyozumi Fukui, Gifu, Japan, assignor to Teijin Seiki Company Limitejd, Osaka, Japan

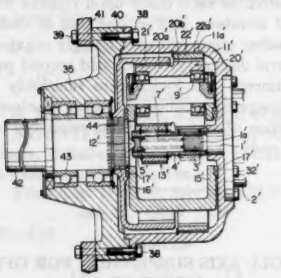
Filed Jun. 25, 1976, Ser. No. 699,971
Claims priority, application Japan, Jul. 4, 1975, 50-82949; Jul. 16, 1975, 50-86895; Sep. 30, 1975, 50-117922
Int. Cl.[2] B62D *55/12*
U.S. Cl. 180—43 B **5 Claims**

1. A driving mechanism comprising:
a stationary structure;
a drive motor fixedly supported by said stationary structure and having an output shaft;
a reduction gear unit including a hollow shaft having a hollow cavity axially extending and splinedly coupled at one end portion with said output shaft of said drive motor, a bearing accommodated in said hollow cavity to be splinedly coupled with the other end portion of said hollow shaft and having a semi-spherical cavity, a compression coil spring accommodated in said hollow cavity and having one end in contact with said output shaft and its other end in contact with said bearing to urge said hollow

shaft and bearing axially outwardly of said hollow shaft and an input sun gear located on the outer periphery of said output shaft; and

a driven body driven by said drive motor through said reduction gear unit and having a central projection opposite said bearing which is semi-spherically formed and rotatably engaging with said semi-spherical cavity of said bearing to retain said input sun gear in axial alignment with said output shaft while said hollow shaft is supported by said output shaft and said central projection so as to be movable in a radial direction thereof to a very small degree.



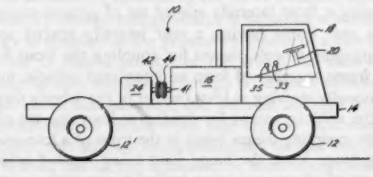


4,116,294

TORQUE EQUALIZER FOR A HYDRAULICALLY DRIVEN, FOUR-WHEEL-DRIVE VEHICLE

Otis A. Johnston, League City, Tex., assignor to Western Geophysical Company of America, Houston, Tex.

Filed Feb. 23, 1977, Ser. No. 771,217
Int. Cl.² B60K *17/10, 17/34*
U.S. Cl. 180—44 F **7 Claims**



1. In a hydraulically driven vehicle, a system comprising at least a first and a second variable-displacement hydraulic pump wherein each said hydraulic pump drives first and second independent hydraulic propulsion means through separate fluid-drive circuits that are inhibited from fluid communication with one another, and in which means are provided for adjusting the displacement of, and hence the driving force delivered by, each said pump in response to a variation of a pilot pressure, the improvement comprising:

directly sensing an imbalance between the hydraulic fluid-drive pressures in said separate fluid drive circuits; and

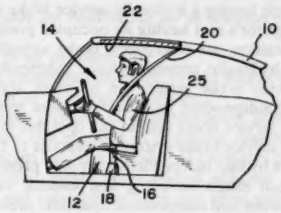
means responsive to said imbalance for changing the pilot pressure applied to the displacement adjusting means in one of said first and second hydraulic pumps so that a change in displacement of said one pump restores equalization of the driving forces delivered to the two independent propulsion means.

4,116,295

ELECTRICALLY OPERATED SEATBELT RETRACTOR

Frederick C. Booth, 930 Larchlea Dr., Birmingham, Mich. 48012

Continuation of Ser. No. 659,172, Feb. 18, 1976, which is a continuation of Ser. No. 246,620, Apr. 24, 1972. This application Oct. 26, 1976, Ser. No. 735,307
Int. Cl.² B60R *21/00*
U.S. Cl. 180—82 C **5 Claims**



1. In a vehicle having a seat, a source of electrical power, a seatbelt system, comprising:

(a) a support;

(b) a retractor member movable on the support in either a belt-extending direction, or a belt-retracting direction;

(c) bias means for urging the retractor member in the belt-retracting direction;

(d) a safety seatbelt connected to the retractor member so as to be retracted as the retractor member is moved in its belt-retracting direction, and to be extended as the retractor member is moved in its belt-extending direction;

(e) a stop member mounted on the support for motion between a stop position in which it is operable to prevent belt extension, and a release position in which it is inoperable to prevent belt extension;

(f) a bias member operable to urge the stop member toward its stop position;

(g) an actuator connected to the stop member, and operable upon being electrically energized to move the stop member toward its release position, the actuator being inoperable when deenergized to prevent movement of the stop member;

(h) circuitry means, independent of the ignition circuit of the vehicle, connected to the source of electrical power and to the actuator for energizing the actuator to allow belt extension, and for automatically deenergizing the actuator in response to a predetermined change in vehicle motion to prevent belt extension,

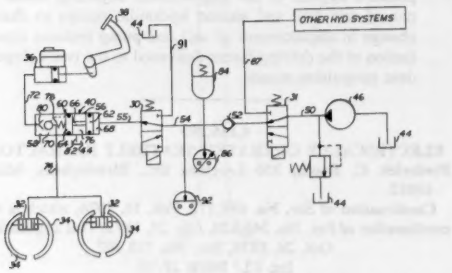
(i) a seat switch in said seat located at a seating position and connected to said circuitry means by an electrical circuit independent of said ignition circuit, said circuitry means responsive to said seat switch, said seat switch responding to occupancy of the seating position, whereby said actuator is energized; and

(j) time delay means associated with said circuit means for delaying energization of said actuator for a predetermined time interval after it has been deenergized.

4,116,296
AUTOMATIC SEAT BRAKE

Walter J. Pleier, Bristol, and James A. Wahl, Langhorne, both of Pa., assignors to Eaton Corporation, Cleveland, Ohio

Filed Mar. 9, 1977, Ser. No. 775,825
Int. Cl.[2] B60T 7/02
U.S. Cl. 180—101 15 Claims



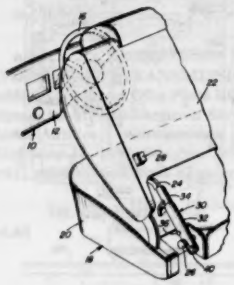
1. In a vehicle having a hydraulic service brake system and a movable operator's seat having an occupied position and an unoccupied position: an emergency brake actuation system comprising a hydraulic pressure source independent of said hydraulic service brake system; an oil-to-oil actuator connected to said independent hydraulic pressure source and to said hydraulic service brake system and operable to pressurize said hydraulic service brake system in response to the application of pressure by said independent hydraulic pressure source; hydraulic circuit means including first selector valve means connected between said independent hydraulic pressure source and said actuator, said first selector valve means having a first position directing oil from said independent hydraulic pressure source to said oil-to-oil actuator to pressurize said hydraulic service brake system, and a second position directing oil to a reservoir to depressurize said hydraulic service brake system; a first solenoid actuator energizable to shift said first selector valve means from said first position to said second position; a first seat switch in circuit with said first solenoid actuator; and control means including control switch means in circuit with said first seat switch and with said first solenoid actuator, said first solenoid actuator being energized only when both said first seat switch and said control switch means are closed.

4,116,297
VEHICLE SEAT LOCK

Curtis R. Ross, 3219 Oak Rd., Cleveland Heights, Ohio 44118; Frank R. Ross, 3676 Burbridge Rd., Cleveland Heights, Ohio 44121; Eugene G. Ross, 3579 Concord Dr., Beachwood, Ohio 44122, and Gloria R. Winborn, 16804 Gerard Ave., Maple Heights, Ohio 44137

Filed Jun. 3, 1977, Ser. No. 803,413
Int. Cl.[2] B60R 25/00
U.S. Cl. 180—114 4 Claims

1. In combination with a vehicle interior of the type including an operator's seat construction and a steering control for effecting steerage of the vehicle, said seat construction including a seat portion and a back rest portion supported from the seat portion for swinging between a rearwardly and upwardly inclined operative position and a forwardly and upwardly inclined inoperative position, said steering control being disposed forward of said back rest portion and in position to be engaged by said back rest portion when the latter is swung toward said inoperative position, said seat portion and back rest portion including coacting abutments abuttingly engageable with each other defining the rearward limit of swinging movement of said back rest portion toward said operative position and which are displaced away from each other when said back rest portion is swung from said operative position toward said inoperative position, and telescopic brace means releasably engageable between said abutments when said back rest portion is in said inoperative position and releasably lockable in position therebetween to prevent movement of said abutments toward each other and thus movement of said back rest portion toward said operative position, said brace means including a pair of end overlapped generally parallel elongated members having a first pair of adjacent ends guidingly supported from each other for relative lengthwise shifting of said

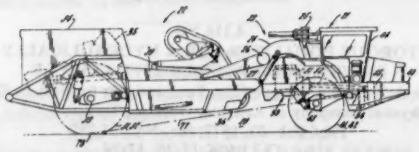


members and a second pair of remote ends extendable and retractable relative to each other upon relative longitudinal shifting of said members, said second pair of ends and said abutments including releasably telescopingly engaged portions preventing lateral disengagement of said second pair of ends from said abutments, and lock means releasably connected between said elongated members operative to selectively limit lengthwise shifting of said members to relatively retract said second pair of ends.

4,116,298
ANGLED ROLL AXIS SUSPENSION FOR OFF-ROAD VEHICLES

John H. Hyler, Peoria, Ill., assignor to Westinghouse Air Brake Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 756,128, Jan. 3, 1977, Pat. No. 4,063,361. This application Jul. 25, 1977, Ser. No. 818,660
Int. Cl.[2] B62D 53/02
U.S. Cl. 180—139 17 Claims



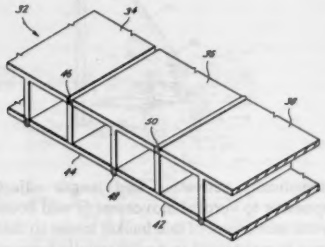
1. In an off-road vehicle, the combination comprising a front frame having a front laterally spaced set of ground-engaging wheels, a rear frame having a rear laterally spaced set of ground-engaging wheels, means for coupling the front frame and rear frame together to form an integrated vehicle, means for intentionally steering at least one set of the wheels thereby to steer the vehicle, means for driving at least one set of the wheels, the coupling means being in the form of a fore-and-aft extending hinge joint, the hinge joint being located adjacent the front set of wheels and being angled downwardly with the extended axis thereof intersecting the ground at a position substantially centered between the rear set of wheels so that the steering direction remains substantially constant in spite of engagement of major ground irregularities by individual ones of the wheels.

4,116,299

T-BAR BASE PLATE FOR A SEISMIC SIGNAL TRANSDUCER

Dallas James Martin, Friendswood, Tex., assignor to Western Geophysical Co. of America, Houston, Tex.

Filed Apr. 4, 1977, Ser. No. 784,108
Int. Cl.[2] G01V *1/14;* B23K *5/66*
U.S. Cl. 181—113 3 Claims



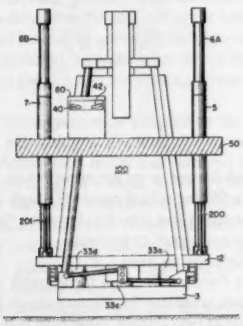
2. In a seismic signal transducer for shaking the ground, a ground contacting base plate of cellular construction, the cells being formed by a plurality of elongated, parallel T-bars each having a flange, the flanges of every T-bar being inverted with respect to the adjacent T-bars, the flanges and stems of adjacent T-bars being joined by a weld.

4,116,300

VIBRATOR TILT CONTROL SYSTEM FOR VEHICLE MOUNTED SEISMIC VIBRATORS

Jacob E. Stone, Bellaire, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Aug. 11, 1977, Ser. No. 823,570
Int. Cl.[2] G01V *1/04*
U.S. Cl. 181—114 9 Claims



8. A method for controlling the tilt of a vehicle upon which a vibratory siesmic energy source is mounted wherein seismic energy is coupled to the ground by means of a baseplate and wherein at least a portion of the weight of said vehicle is applied to said baseplate through a support structure positioned above said baseplate and wherein air bags couple substantially vertical forces from said support structure to said baseplate, said air bags being positioned on said baseplate such that at least one air bag is located on each of the two opposite side of said seismic energy source, which comprises:

detecting the direction of tilt of said vehicle; and

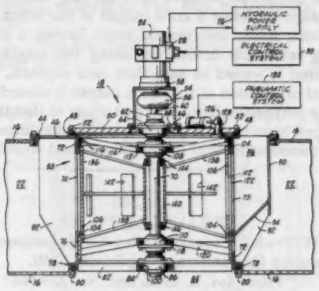
decreasing the pressure in the air bag on the side of the seismic energy source opposite the direction of tilt of said vehicle.

4,116,301

ROTARY AIR MODULATOR

Delbert W. Fair, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Mar. 3, 1977, Ser. No. 773,924
Int. Cl.[2] G01V *1/14*
U.S. Cl. 181—119 16 Claims



1. Apparatus for modulating air at selected pressure, comprising:

a source of air pressure;

a plenum enclosure connected to said source to receive and maintain air at elevated pressure;

stator means disposed in communication with said plenum by means of a plurality of circularly disposed ports;

shutter means having a plurality of circularly disposed ports, said shutter means being placed adjacent to said stator means and rotatable to open and close said stator means ports;

rotor means having a plurality of circularly disposed ports, said rotor means being placed adjacent to said stator means and shutter means in rotational support;

means actuatable to rotate said shutter means to open and close said stator means ports; and

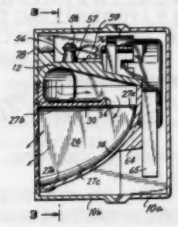
motor means energizable to rotate said rotor means at selected rotational speed.

4,116,302

HORN LOUDSPEAKER

Frederick L. Seebinger, Smoke Rise, N.J., assignor to American Trading and Production Corp., Baltimore, Md.

Filed Mar. 17, 1977, Ser. No. 778,813
Int. Cl.[2] H05K *5/00;* G10K *11/00*
U.S. Cl. 181—192 8 Claims



1. A horn loudspeaker having an integrated sound chamber and horn assembly comprising a sound chamber adapted to receive a diaphragm and magnetic loudspeaker driver assembly, said sound chamber forming a sound opening having a predetermined acoustic orientation, a first horn stage having a first opening acoustically coupled to said sound opening, said first horn stage including a first portion having a flare rate that expands as said first stage extends away from said first opening

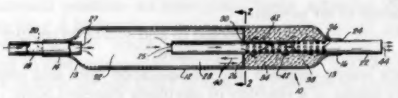
and a restrictive portion defining a further opening, said first stage having an acoustical orientation, at said restrictive portion, that is turned at least 180° in a first plane from the predetermined acoustical orientation of said sound opening, and an output horn stage acoustically coupled at a first end thereof to said restrictive portion of said first horn stage to define an acoustical junction therebetween, said output horn stage having a flare rate that expands as the output stage extends away from said acoustical junction between said first stage and said second stage to define a horn output at the other end of said output horn stage, said second stage having a continuously changing acoustical orientation along the lengthwise extent thereof that is varied as said flare rate expands, so that the acoustical orientation at said horn output is turned at least 90° in a plane perpendicular to said first plane so that the output of said second horn stage is oriented in the same direction as the predetermined acoustical orientation of said sound opening.

4,116,303

EXHAUST MUFFLER

Richard W. Trudell, Fountain Valley, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Nov. 8, 1976, Ser. No. 739,466
Int. Cl.² F01N *1/04, 1/00*
U.S. Cl. 181—252 **22 Claims**



1. A muffler comprising a casing, an inlet to said casing and an outlet from said casing, an elongated exit tube passing through said outlet and extending within said casing for a distance of at least one half the interior length of said casing, said exit tube being coaxially aligned with said inlet, baffle means positioned in the annulus between the outer wall of said exit tube and the inner wall of said casing, and intermediate the ends of said exit tube, forming a first chamber extending from said baffle means to the inlet end of said casing and communicating with said inlet, and a second chamber provided by the annular space between the outer wall of said exit tube and the inner wall of said casing and extending from said baffle means to the outlet end of said casing, the inner end of said exit tube extending into said first chamber and in communication therewith, said exit tube being perforated along the area thereof adjacent to said second chamber, and sound absorber material filling said second chamber.

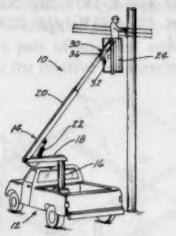
4,116,304

AERIAL PERSONNEL LIFT INCLUDING MEANS FOR AUTOMATICALLY CONTROLLING THE POSITION OF THE PERSONNEL BUCKET

Morris S. Durnell, Emmetsburg, Iowa, assignor to Durnell Engineering, Inc., Emmetsburg, Iowa

Filed Apr. 25, 1977, Ser. No. 790,307
Int. Cl.² B66F *11/04*
U.S. Cl. 182—2 **4 Claims**

1. An aerial personnel lift comprising,
a wheeled frame means,
a boom means having one end operatively pivotally and rotatably secured to said frame means,
an aerial personnel bucket means pivotally secured to the other end of said boom means about a horizontal axis transverse to the longitudinal axis of said boom means,
an electrically activated length adjustable means pivotally secured to and extending between said boom means and said bucket means,
a source of electric power for said length adjustable means,
an electrical switch assembly rigidly secured to said bucket means and including a pair of elongated mercury switches secured to said switch assembly in stationary relation to said bucket means and inclined relative to a horizontal plane when said bucket means is in a vertical position, said mercury switches electrically connected to said length adjustable means and said source of electric power for



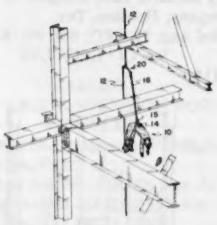
automatically activating said length adjustable means responsive to vertical movement of said boom means and pivotal movement of said bucket means so that said bucket means is maintained in a substantially vertical position.

4,116,305

MECHANICAL ROBE GRAB

Arthur J. Leduc, Sarnia, Canada, assignor to Leduc Safety Basket Corporation, Ontario, Canada

Continuation-in-part of Ser. No. 742,279, Nov. 16, 1976, abandoned. This application Jul. 11, 1977, Ser. No. 814,661
Int. Cl.² A62B *35/00*
U.S. Cl. 182—3 **10 Claims**



1. A rope grab for use as an arresting device in co-operation with a rope as a lifeline which passes through the rope grab to a worker, and a safety line attached between the rope grab and the worker, the rope grab comprising:
(a) a collar defining an axis;
(b) a jaw-like frame, defining a throat with distal and proximate regions, whereby the throat extends from the margin of the collar as two fingers, diverging from an intersection and medially bent in the same direction and with their respective distal ends joined whereby the fingers define the throat, with its distal throat region intersecting the prolongation of the axis and having a larger cross sectional area than its proximate throat region, which is bounded by the collar and the proximate ends of the finger-like members; and,
(c) means for attaching near the distal end a safety line whereby the lifeline extending through the collar and throat will normally assume a position relatively co-incident to the axis and its prolongation and hence extend through the distal throat region, but when tension is applied via the safety line to the distal end, the grab pivots and wedges the rope between the finger-like members in the proximate throat region.

4,116,306
ELEVATOR CAR GENERATOR-MOTOR-BRAKE CONTROL UNIT APPARATUS AND METHOD

Don B. Alley, Sacramento, Calif., assignor to Elevator Industries, Sacramento, Calif.

Filed Apr. 29, 1977, Ser. No. 792,399
Int. Cl.[2] B66B *1/30*
U.S. Cl. 187—29 R 17 Claims

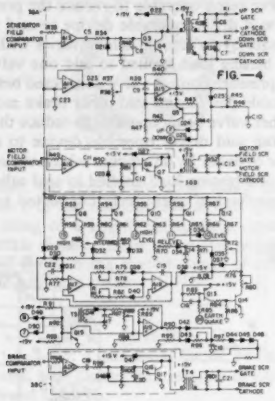


FIG.—4

1. A control system for a generator, a hoist motor, and a hoist motor brake, which function to position an elevator car in an elevator hoistway in response to speed and direction inputs, the generator having a generator field winding and a driver, the hoist motor having a motor field winding and an output shaft coupled to drive the elevator car in the hoistway, and the hoist motor brake having an actuating coil operating to control engagement of the brake with the hoist motor output shaft, the system being energized by an alternating power source signal, comprising

a master waveform generator coupled to the power source signal and providing a predetermined ramp waveform having predetermined initial and terminal levels,

means for providing an output level command signal in response to the speed and direction inputs,

a generator field comparator coupled to said predetermined ramp waveform and said output level command signal and providing a generator field trigger signal in response to comparison therebetween,

a motor field comparator coupled to said predetermined ramp waveform and said output level command signal and providing a motor field trigger signal in response to comparison therebetween,

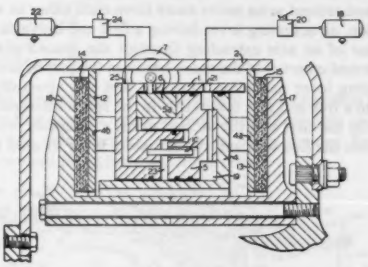
a brake comparator coupled to said predetermined ramp waveform and said output level command signal and providing a hoist motor brake trigger signal in response to comparison therebetween,

and a plurality of power metering circuit elements coupled to the power source signal and each receiving one of said generator field, motor field, and hoist motor brake trigger signals at a control input thereon, whereby respective ones of said plurality of power metering circuit elements are duty cycle controlled to pass the power source signal to energize the generator field winding, the motor field winding, and the hoist motor brake actuating coil in accordance with the speed and direction inputs.

4,116,307
FLUID PRESSURE OPERATED DISC BRAKE HAVING SERVICE, AUXILIARY AND PARKING BRAKE SYSTEMS

Erich Reinecke, Beinhorn, Fed. Rep. of Germany, assignor to WABCO Westinghouse GmbH, Hanover, Fed. Rep. of Germany

Filed Oct. 5, 1977, Ser. No. 839,543
Claims priority, application Fed. Rep. of Germany, Oct. 16, 1976, 2646870
Int. Cl.[2] F16D *55/10, 65/24*
U.S. Cl. 188—106 P 16 Claims



1. A fluid pressure operative disc brake unit having at least one brake shoe adapted to be actuated into frictional engagement with a rotor member of said brake unit in response to operation of either a service brake valve device to which a service supply reservoir is connected or a parking brake valve device to which an auxiliary supply reservoir is connected, said disc brake unit comprising:

(a) a brake cylinder device;

(b) piston means for effecting actuation of said at least one brake shoe into engagement with said rotor member comprising:

(i) a service piston engageable with said at least one brake shoe and operative in said brake cylinder device responsive to the supply of said service reservoir pressure to a first actuating chamber thereof via said service brake valve device for movement to a brake application position; and

(ii) an auxiliary piston cooperatively arranged in said brake cylinder device between said service piston and said brake cylinder such as to form said first actuating chamber at the one face thereof and to further form a second actuating chamber at the opposite face thereof to which the connection of auxiliary supply reservoir pressure via said parking brake valve device urges said auxiliary piston into engagement with said service piston to move the latter into said brake application position; and

(c) locking means including an adjustable filling piece interposed between said brake cylinder and said auxiliary piston for maintaining said service piston in said brake application position following the release of fluid pressure from said second actuating chamber.

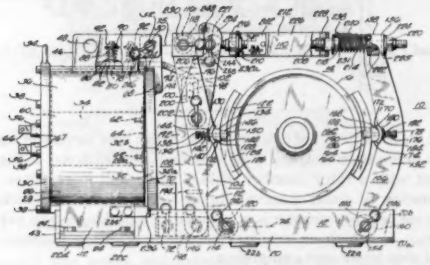
4,116,308
ELECTROMAGNETICALLY OPERATED FRICTION BRAKE

Janez F. Sever, Mequon, Wis., assignor to Square D Company, Park Ridge, Ill.

Continuation-in-part of Ser. No. 737,802, Nov. 1, 1976, abandoned. This application May 13, 1977, Ser. No. 796,582
Int. Cl.[2] B60T *13/04*
U.S. Cl. 188—171 15 Claims

1. A brake assembly for controlling rotative movement of a brake drum comprising: a base, a pair of spaced pivots on the base, a first brake arm extending upwardly of the base and

having an end pivoted on a first of said pair of pivots and a free end remote from the pivoted end, a second brake arm extending upwardly of the base in spaced relation to the first brake arm and having an end pivoted on a second of said pair of pivots and a free end remote from the pivoted end spaced from the free end on the first arm, a brake drum positioned forwardly of the base between the first and the second arms, a first and a second brake shoe pivotally mounted intermediate the ends of the first and second arms respectively to frictionally engage outer surface portions of the drum when the free ends of the first and the second arms are moved toward each other to a first position and to move out of the frictional engagement and release the drum for rotation when the free ends on the first and second arms move away from each other to a second position, an actuating lever having a first end movable along a portion of an axis extending through the spaced pivots and positioned external of the space between the pair of pivots, said actuating lever extending from the first end upwardly of the base to a free end that is movable in the space between the free ends on the first and the second arms, a rotatable connection between the first arm and the actuating lever located between



the mounting portion for the first brake shoe and the free end of the first arm, an operating rod pivotally interconnecting the free ends of the actuating lever and the second arm, a member having a first end pivotally connected to the free end of the first arm and extending to a second portion that is spaced between the free ends of the first and the second arms, a first spring reacting between the rod and the member constantly urging the first and the second arms toward their respective first positions, a pivot for the actuating lever spaced a predetermined distance from the connection between the first arm and actuating lever and the connection between the operating rod and the actuating lever, yieldable means automatically positioning the pivot for the actuating lever at a position which causes the first and the second brake shoes to simultaneously engage the brake drum during movement of the first and second arms from their respective second to first positions, and an energizable operating means having an operating member operatively connected to the operating lever for causing the first and second arms to move to their respective second positions when the operating means is energized and the operating member moves from a de-energized to an energized position.

4,116,309

FLUID PRESSURE BRAKING SYSTEMS FOR VEHICLES

Alastair John Young, Leamington Spa, England, assignor to Automotive Products Limited, Leamington Spa, England

Filed Oct. 26, 1976, Ser. No. 735,518

Claims priority, application United Kingdom, Oct. 29, 1975, 44740/75

Int. Cl.[2] B60T *8/18*

U.S. Cl. 188—195 **19 Claims**

1. In a vehicle having a body supported by a resilient suspension system, one rear wheel on one side of the vehicle and another rear wheel on the other side of the vehicle, one suspension component which moves with vertical movement of said one rear wheel relative to the vehicle body and another suspension component which moves with vertical movement of said other rear wheel relative to the vehicle body, a fluid pressure braking system which comprises:

a driver operable brake application control device, which provides a controlled source of fluid pressure;

one brake operative to brake said one rear wheel;

another brake operative to brake said other rear wheel;

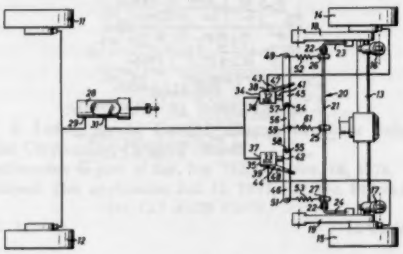
one brake motor cylinder operative to apply said one brake;

another brake motor cylinder operative to apply said other brake;

one fluid pressure control valve connected between said driver operable device and said one brake motor cylinder, said one valve being operable to reduce the pressure supplied from said driver operable device to said one brake motor cylinder by an amount which varies with the magnitude of a biasing load applied to said one valve;

another fluid pressure control valve connected between said driver operable device and said other brake motor cylinder, said other valve being operable to reduce the pressure supplied from said driver operable device to said other brake motor cylinder by an amount which varies with the magnitude of a biasing load applied to said other valve;

one control mechanism operatively connected to said one



valve and to said one suspension component, said one control mechanism including resilient means by which the magnitude of the biasing load applied to said one valve is varied with movement of said one suspension component such that any reduction in the pressure supplied to said one brake motor cylinder is proportionally greater as the load carried by said one rear wheel is reduced;

another control mechanism operatively connected to said other valve and to said other suspension component, said other control mechanism including resilient means by which the magnitude of the biasing load applied to said other valve is varied with movement of said other suspension component such that any reduction in the pressure supplied to said other brake motor cylinder is proportionally greater as the load carried by said other rear wheel is reduced;

and interconnection means interconnecting said control mechanisms such that the change in biasing load on each of said valves is greater when both rear wheels move vertically relative to the vehicle body by the same amount but in different directions that when both rear wheels move vertically relative to the vehicle body by said same amount and in the same direction.

4,116,310

COMBINED SHOULDER STRAP BAG AND CUSHION

Mary J. Shields, P.O. Box 207, Hastings, Mich. 49058

Filed Mar. 25, 1977, Ser. No. 781,526

Int. Cl.[2] A45C *15/00*

U.S. Cl. 190—42 **7 Claims**

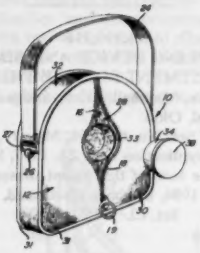
1. A combined seat cushion and article carrier, comprising:

cushion body means having a recess formed in one major surface face thereof for receiving at least one article therein;

covering means for encasing at least a portion of the cushion body means, said covering means having an opening

formed therein and surmounting at least a portion of the recess in the cushion body means, the opening providing access to the recess from externally of the covering means; and,

a strap adapted to be grasped by or worn over the shoulder



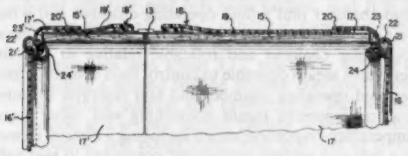
of a user, the ends of the strap being connected to the periphery of the seat cushion at two spaced points, the strap being of a length substantially equal to the larger perimetric distance taken about the periphery of the seat cushion between the spaced points of connection of the strap to said seat cushion.

4,116,311

LUGGAGE CASE

Michael Davis, New Castle, Pa., assignor to Airway Industries, Inc., Ellwood City, Pa.

Filed Nov. 29, 1977, Ser. No. 855,680
Int. Cl.[2] A45C *3/00*
U.S. Cl. 190—49 **3 Claims**



1. In a luggage case of the type comprising a body portion and a covering lid portion, respectively having substantially rectangular frames of corresponding contour, and covers which are stretched tautly over said frames, the improvement wherein each of said covers comprises a portion of a single thickness of covering material surrounding each of the said frames, a side wall portion for each of said frames of a single thickness of covering material, a relatively narrow strip of a single thickness of covering material coextensive in length to the surrounding portion and attached adjacent to the outer edge of the surrounding portion of covering material and projecting therebeyond, and corner edge welting attached between the outer edge of said separate strip and the periphery of the side wall portions of the covers.

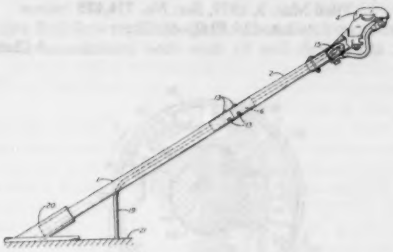
4,116,312

MINE VEHICLE TROLLEY POLE

Stuart L. Adler, McMurray, and William O'Neil Hunt, Pittsburgh, both of Pa., assignors to Permali, Incorporated, Mount Pleasant and Shields Rubber Corporation, Pittsburgh, both of, Pa., part interest to each

Filed Sep. 28, 1977, Ser. No. 837,312
Int. Cl.[2] B60L *5/12*
U.S. Cl. 191—64 **8 Claims**

1. A mine vehicle trolley pole assembly comprising a hollow pole having upper and lower ends and an opening in the side of its lower portion, a trolley wire contact shoe mounted on the upper end of the pole, the pole being divided transversely into upper and lower sections, a fuse case fitting inside the pole and extending into both of said sections to connect them, a fuse contact disposed inside each end of said case, an electric cable extending from said shoe down through the hollow pole to the



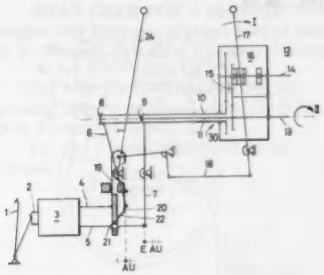
upper fuse contact, and a second electric cable extending from the lower fuse contact down through the hollow pole and out through said side opening, said pole being formed from a filament-wound fiberglass reinforced plastic.

4,116,313

DRIVE MECHANISM FOR UTILITY OR COMMERCIAL VEHICLES SUCH AS TRACTORS, CONSTRUCTION MACHINERY OR THE LIKE

Paul Maucher, Sasbach, Germany, assignor to Luk Lamellen und Kupplungsbau GmbH, Sasbach, Germany

Filed Sep. 7, 1976, Ser. No. 720,632
Claims priority, application Fed. Rep. of Germany, Sep. 10, 1975, 2540214
Int. Cl.[2] G05G *5/10, 11/00*; F16D *67/00*
U.S. Cl. 192—3.63 **8 Claims**



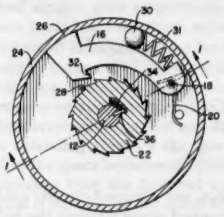
1. Drive mechanism for heavy vehicles such as tractors, construction machinery and the like, wherein one (31) of two clutches (31, 32) is selectively blocked by a shifting device (3) so as to prevent engagement and disengagement thereof, while the other (32) of the two clutches (31, 32) is released so as to be engageable and disengageable, and wherein an output shaft (13) of a transmission (12) is drivable by the one clutch (31) in one rotary direction, and the same output shaft (13) is drivable by the other clutch (32) in the other rotary direction, a set of reversing gears (15) being connectible to the transmission (12) through the other clutch (32), comprising a control clutch (16) disposed in force transmission path between the other clutch (32) and the output shaft (13) of the transmission (12), and including an additional output shaft (14) for an auxiliary drive, and means (4, 6, 8; 5, 7, 9) for shifting power flow selectively to the output shaft (13) of the transmission (12) and to said additional output shaft (14) thereof.

4,116,314

OVER RUNNING CLUTCH

Leonard Stanley Ackerman, 355 Lakeview Ave., Rockville Center, N.Y. 11570

Filed Mar. 3, 1977, Ser. No. 774,175
Int. Cl.[2] F16D *41/12*
U.S. Cl. 192—46 **3 Claims**



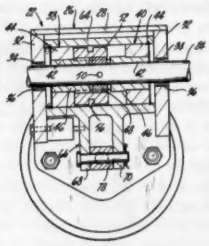
1. An over running pawl and ratchet device comprising a ratchet wheel mounted on a first shaft and having ratchet teeth about its periphery, a coaxial race surrounding but spaced from said ratchet wheel, a second rotatable shaft, a pawl mounted on said second rotatable shaft coaxial of said ratched wheel between said ratchet wheel and said race, means biasing said pawl away from said ratchet wheel, a movable element between said pawl and said race, the outer surface of said pawl being so shaped that as said second shaft is rotated in one direction, said movable element contacting both said race and the outer surface of said pawl, wedges said pawl radially inwardly into engagement with said ratchet wheel.

4,116,315

LANDING GEAR ACTUATOR

Ervin K. Vandenberg, Muskegon, Mich., assignor to Westran Corporation, Muskegon, Mich.

Filed Jan. 6, 1977, Ser. No. 757,305
Int. Cl.[2] F16D *41/04*
U.S. Cl. 192—48.92 **11 Claims**



1. For use with a landing gear assembly having an extendable and retractable foot and an input member the rotation of which extends or retracts the foot in dependence upon the direction of rotation of said member, a landing gear actuator comprising:

a rotatable member drivingly connected with said input member;

a one-way clutch having a driven member and a drive member, said driven member being rotatably positioned around said rotatable member;

means for selectively drivingly connecting said driven member with said rotatable member, said means comprising an annular member fixedly attached to the rotatable member at a position axially spaced from the driven member, and a shifting gear disposed around said annular member and fixed against rotation with respect to the annular member, said shifting gear being axially movable between a position in which said shifting gear rotatably drivingly connects the driven member with the annular member and a further position in which the shifting gear is out of engagement with the driven member; and

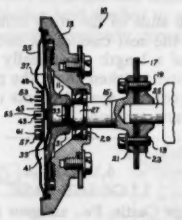
means for reciprocally rotatably driving said clutch drive member.

4,116,316

FLUID COUPLING DEVICE AND BIMETAL COIL ADJUSTMENT FOR USE THEREIN

Kenneth R. Streeter, Marshall, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 687,264, May 17, 1976, Pat. No. 4,054,193. This application Aug. 24, 1977, Ser. No. 827,414
The portion of the term of this patent subsequent to Oct. 18, 1994, has been disclaimed.
Int. Cl.[2] F16D *31/08*
U.S. Cl. 192—58 A **5 Claims**



1. A fluid coupling device including a first rotatable member, cover means associated with said first member to define a fluid chamber therebetween, a valve plate disposed to separate said fluid chamber into a fluid operating chamber and a fluid reservoir chamber, a second rotatable member disposed in said fluid operating chamber and rotatable relative to said first member, valve means operable to control fluid communication between said operating chamber and said reservoir chamber, temperature-responsive means controlling said valve means, said temperature-responsive means including a bimetal element having a first end portion operatively connected to said valve means and a second end portion, bracket means fixed relative to said device and including a generally flat terminal portion extending away from said cover means, a clip member including means receiving said second end portion of said bimetal element and substantially preventing rotational movement of said second end portion relative to said first end portion, said clip member being disposed in movable engagement with said terminal portion of said bracket means to permit adjustment of said second end portion of said bimetal element relative to said first end portion.

4,116,317

FLUID COUPLING DEVICE WITH IMPROVED DISENGAGED OPERATING CHARACTERISTICS

Kenneth R. Streeter, Marshall, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Feb. 2, 1977, Ser. No. 764,772
Int. Cl.[2] F16D *31/08, 33/20*
U.S. Cl. 192—58 B **11 Claims**

1. A fluid coupling device comprising:

(a) a first rotatable member;

(b) cover means associated with said first member to define a fluid chamber therebetween;

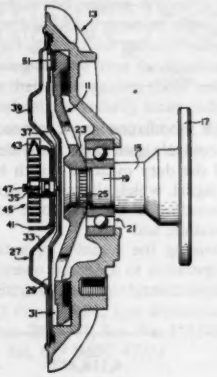
(c) a valve plate disposed to separate said fluid chamber into a fluid operating chamber and a fluid reservoir chamber;

(d) a second rotatable member disposed in said fluid operating chamber and being rotatable relative to said first member, said second member having first and second wall surfaces oriented generally perpendicular to the axis of

rotation of said members and defining a thickness T therebetween, said second wall surface of said second member and an adjacent surface of said first member cooperating to define a shear space therebetween;

(e) valve means associated with said valve plate to control the flow of fluid between said reservoir chamber and said operating chamber and temperature-responsive means associated with said valve means to effect the operation of said valve means in response to variations in a pre-determined temperature condition;

(f) said second member defining a generally annular outer



surface and said first member defining a generally annular inner surface; and

(g) said outer surface including a first surface portion disposed adjacent said first wall surface, said first surface portion being generally cylindrical, closely spaced apart from said annular inner surface, and extending axially a distance less than about T/3, said outer surface further including a second surface portion contiguous with said first surface portion and extending to said second wall surface, said second surface portion being generally frusto-conical and cooperating with said axis of rotation to define an included angle between about 15° and about 45°.

4,116,318

FLUID FLOW RESTRICTION PATH IN VISCOUS FLUID CLUTCH

Richard T. Crisenbery, Parma, and Thomas H. Tinholt, Marshall, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Apr. 5, 1977, Ser. No. 784,898
Int. Cl.[2] F16D *35/00, 43/25*
U.S. Cl. 192—58 B **11 Claims**

1. A viscous fan drive comprising:

(a) a housing rotatable about an axis and defining a cavity having a working chamber and a reservoir;

(b) a clutch member rotatable about said axis and located within said working chamber;

(c) an annular shear area within said working chamber defined by said members and located radially outwardly from said axis;

(d) viscous shear fluid located within said cavity;

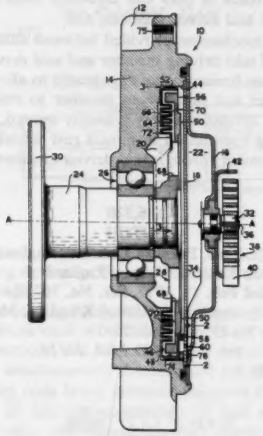
(e) means to direct said fluid from said reservoir to said shear area;

(f) means to pump said fluid from said shear area to said reservoir, said pumping means being located radially outwardly from said shear area;

(g) an input shaft mounted for rotation about said axis on one of said members and secured to the other member whereby rotation of said input shaft will cause rotation of said one member when viscous fluid is located within said annular shear area;

(h) a plurality of circumferentially spaced fluid flow paths extending radially on said clutch member through said shear area, each flow path having an effective area of A units and being in fluid communication with said directing means; and

(i) a fluid flow restriction path on said clutch member in fluid communication with each of said flow paths radially



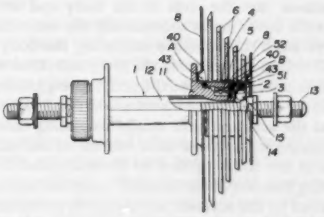
outwardly from said shear area and in fluid communication with said pumping means to direct substantially all of said fluid from said respective flow path to said pumping means, each restriction path having an effective area of B units, the value of B units being less than the value of A units to restrict, within said restriction path, said fluid flow from said respective flow path to said pumping means.

4,116,319

REAR GEAR FOR A BICYCLE

Masashi Nagano, and Etsuyoshi Watarai, both of Sakai, Japan, assignors to Shimano Industrial Company Limited, Osaka, Japan

Filed May 18, 1977, Ser. No. 798,140
Claims priority, application Japan, May 25, 1976, 51-60816; May 25, 1976, 51-60817
Int. Cl.[2] F16D *41/04;* F16H *11/08*
U.S. Cl. 192—64 **10 Claims**



1. A rear gear mounted to a rear wheel hub of a bicycle, said rear gear comprising,

(a) a cylindrical driven member rotatable jointly with said rear wheel hub,

(b) a cylindrical driving member supported on the outer periphery of said driven member,

said driving member being radially positioned at its inner periphery with respect to the outer periphery of said driven member, being supported rotatably with respect to said driven member, and being movable axially of said

driven member, said driving member and driven member forming therebetween axially opposite surfaces, said driving member having at its outer periphery two or more differently sized sprockets,

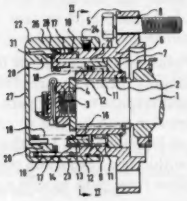
(c) a unidirectional transmission provided between the radially opposite surfaces of said driving member and said driven member, said transmission serving to transmit a rotational force in only one direction from said driving member to said driven member, and

(d) a clutch mechanism provided between axially opposite surfaces of said driving member and said driven member, said clutch mechanism being engageable to allow said driving member and said driven member to rotate together when said driving member is axially moved, a rotational force being transmitted from said rear wheel hub to said driving member through said driven member.

4,116,320
CLUTCH

Douglas John Quilliam, Pensilva Liskeard, England, assignor to Fairey Winches Limited, Heston, England

Filed Feb. 11, 1977, Ser. No. 767,834
Claims priority, application United Kingdom, Mar. 30, 1976, 12785/76; Nov. 24, 1976, 49040/76
Int. Cl.[2] F16D *1/06, 23/14*
U.S. Cl. 192—89 A **12 Claims**



1. In a hub clutch for the wheel of a vehicle, the clutch comprising an inner drive member, an external annular body encircling the drive member and being radially spaced therefrom; a bearing which maintains the body coaxial with the drive member; an annular clutch member coaxial with the drive member and the body, the clutch member being rigid in rotation with the body but being axially movable for selective engagement and disengagement with the drive member as regards rotation; an axially movable actuator connected to and spaced axially from the clutch member by spring connecting means; means for preventing rotation of the actuator relative to the body; and an axially fixed cover mounted on the body: the improvement that the ends of the body and drive member adjacent the cover are at substantially the same axial position, the cover has a rim coaxially encircling the body and has an end wall axially spaced from the body and drive member, the cover is rotatable relative to the body, spring biasing means are provided for urging the actuator towards the end wall, the end wall and the actuator have axially extending cam formations which cooperate to cause axial motion of the actuator upon rotation of the cover relative to the body, and the means for preventing rotation of the actuator comprise axially extending pins carried by the actuator and engaging permanently in axial slots in the body.

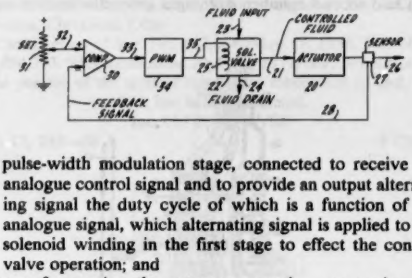
4,116,321
VALVE ARRANGEMENT FOR CLOSED-LOOP CONTROL SYSTEM

Alan Leonard Miller, Mount Prospect, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 27, 1976, Ser. No. 754,382
Int. Cl.[2] F16D *23/10, 43/06*
U.S. Cl. 192—103 F **8 Claims**

1. A control system for changing the pressure of a fluid to operate an actuator as a function of an analogue control signal, comprising:

a two-stage, four-way control valve in which the second stage is a power stage for producing the pressure change in the fluid in response to actuation of the first stage, and the first stage is a pilot stage which includes a solenoid valve with a winding connected to translate a signal to the second stage as a function of the signal received by the solenoid winding;



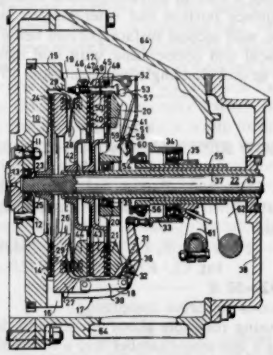
a pulse-width modulation stage, connected to receive the analogue control signal and to provide an output alternating signal the duty cycle of which is a function of the analogue signal, which alternating signal is applied to the solenoid winding in the first stage to effect the control valve operation; and

means for sensing the actuator operation, comparing the actuator operation to a desired operation, and providing said analogue control signal as a function of such comparison.

4,116,322
CLUTCHES

Herbert Edward Ashfield, Huddersfield, England, assignor to David Brown Tractors Limited, Huddersfield, England

Filed Jan. 12, 1977, Ser. No. 758,754
Claims priority, application United Kingdom, Feb. 14, 1976, 5887/76
Int. Cl.[2] F16D *21/06*
U.S. Cl. 192—48.8 **8 Claims**



1. An engine/dual clutch combination including an engine flywheel having a counterbore defined by a recessed driving surface and a surrounding axially-projecting flange on the face of the flywheel remote from the engine; an annular clutch casing rigidly secured co-axially to the flywheel and having a radially-inwardly projecting flange with a driving surface on its face adjacent the flywheel; a power take-off shaft journalled co-axially in the flywheel; power take-off clutch means disposed partially within the counterbore in the flywheel; an output sleeve co-axially surrounding the power take-off shaft on that side of the power take-off clutch means remote from the flywheel; multi-plate drive clutch means comprising twin drive clutch plates carried driveably by the output sleeve, that one of said twin clutch plates remote from the flywheel being frictionally engageable between the driving surface on the

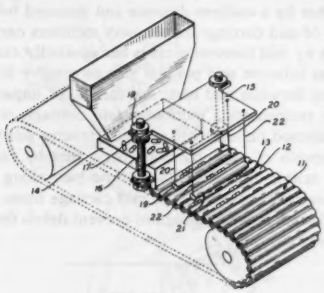
flange on the clutch casing and a drive clutch auxiliary pressure plate interposed between the twin drive clutch plates, and that one of said twin clutch plates adjacent the flywheel being frictionally engageable between said auxiliary pressure plate and a drive clutch main pressure plate, said auxiliary and main clutch pressure plates being axially movable; said main pressure plate and the power take-off clutch means being both urged in thier respective clutch-engaging directions by common resilient means; and means for moving said main pressure plate in a direction towards the flywheel against the action of the resilient means to disengage the drive clutch comprising a plurality of circumferentially-spaced rods rigidly secured to said main pressure plate and passing driveably through apertures in the drive clutch auxiliary pressure plate, and respective second-class levers pivoted at their radially outer ends on that end of the clutch casing remote from the flywheel and capable of abutting between their ends against those ends of said rods remote from the flywheel, the radially inner ends of said levers being moveable in a direction towards the flywheel by an axially-slideable drive clutch operating sleeve.

4,116,323

APPARATUS FOR CONVEYING OBJECTS ONE BY ONE

Peter J. Dragotta, 23 Franklin Pl., East Rutherford, N.J. 07073

Filed Jun. 29, 1977, Ser. No. 811,048
Int. Cl.[2] B65G *47/14*
U.S. Cl. 198—453 **3 Claims**



1. An apparatus for singulating superposed objects on a conveyor for inspection comprising:

a. a conveyor for articles,

b. a plurality of transverse, successive spaces on the conveyor,

c. the spaces on the conveyor dimensioned generally to receive only a single layer of articles,

d. means to operate the conveyor from an article delivery station to an article discharge station,

e. a stationary support for a bar disposed over the conveyor,

f. means to deflectively suspend a bar, attached at one end to the stationary support, and at the other end to the bar,

g. a bar attached to the means to support and disposed transversely with respect to the direction of movement of the conveyor,

h. the bar further disposed in spaced relation to the spaces on the conveyor a distance sufficient to pass a single article on a space, but insufficient to pass an article superposed on another article on a space on the conveyor,

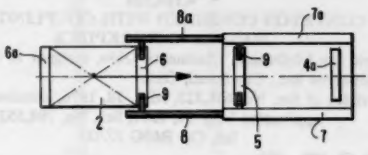
i. the weight of the bar being sufficient to displace a superposed article on the moving conveyor that the bar encounters, and to move it onto a successive empty space on the conveyor.

4,116,324

LOADING DEVICE

Karl-Heinz Burmeister, Kleve, Niederrhein, Fed. Rep. of Germany, assignor to Ipsen Industries International Gesellschaft mit beschrankter Haftung, Kleve, Niederrhein, Fed. Rep. of Germany

Filed Oct. 27, 1976, Ser. No. 735,977
Claims priority, application Fed. Rep. of Germany, Nov. 8, 1975, 2550323
Int. Cl.[2] B65G *25/12*
U.S. Cl. 198—472 **8 Claims**



1. A loading device for the conveyance of transport containers, comprising

two endless chains being rotatably mounted parallel to and spaced from each other and each of said chains defining upper portions, and lower portions, respectively,

means for simultaneously rotating said two endless chains,

two loading rods being mounted adjacent thereabove and parallel to said upper portions of said endless chains, respectively, and longitudinally displaceable relative thereto, said loading rods defining ends,

two finger means arranged spaced from one another on each of said loading rods adjacent said ends thereof,

said two finger means for releaseably operatively coupling said loading rods to adjacent of said two endless chains, respectively, and to a transport container, respectively, in a transport condition thereof, whereby said rods are longitudinally driven by said endless chains in longitudinally extending positions of said loading rods relative to said upper portions of said endless chains, whereby the transport container is moved by said longitudinal rods via said finger means, respectively,

said upper portions of said endless chains being adapted to carry the transport container when the latter is located in positions over said endless chains on said upper portions of said endless chains,

two driver rail means extend crosswise to said two endless chains and being connected to said two endless chains, said two driver rail means for operatively moveably engaging the transport container when the latter is in said positions on said upper portions of said endless chains, respectively,

a transverse rail extends transversely to said two endless chains and being connected to both said endless chains and is located on corresponding one of said portions of said two endless chains when both said two driver rail means are located on the corresponding other of said portions of said two endless chains,

two downwardly opening U-shaped container rail means for releaseably engaging at least one of said two driver rail means, respectively, when the transport container is in said positions on said upper portions of said endless chains, whereby the transport container can be moved by said endless chains via said driver rail means when the transport container is in said positions on said upper portions of said endless chains, said container rail means for being joined to said transport container on opposite ends thereof, respectively,

means for rotating said loading rods operatively into and out of engagement with said transverse rail and said container rail means, respectively,

said two finger means of both of said two loading rods for releaseably engaging said transverse rail and said con-

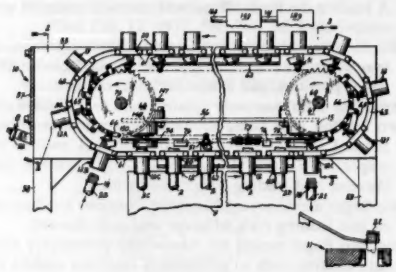
tainer rail means, respectively, whereby said loading rods can be moved by said endless chains via said transverse rail and said transport container can be additionally moved via said loading rods, respectively, when said loading rods are in the longitudinally extended positions relative to said upper portions of said endless chains and the transport container is longitudinally spaced apart from said endless chains, respectively.

4,116,325

CONVEYOR COMBINED WITH COUPLING FOR HANDLING WORKPIECE

David Ian McDonald, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Division of Ser. No. 668,323, Mar. 18, 1976, abandoned. This application May 19, 1977, Ser. No. 798,552
Int. Cl.[2] B65G *37/00*
U.S. Cl. 198—484 **2 Claims**



1. An improved coupling assembly for use in combination with a conveyor means to form a machine that carries a hollow workpiece between a workpiece loading station and a workpiece unloading station and then returns to the former which machine further includes conveyor means movably mounted relative to the base of said machine for supporting at least one such coupling for repeated movement along respective first and second paths to and away from said respective stations for loading and unloading and wherein said improved coupling comprises

(a) a carrier that is a part of said conveyor means;

(b) a support member having an upper stem portion and a lower portion, said upper portion being mounted on said carrier to revolve but not reciprocate relative to said carrier, said lower portion being cup-shaped, the cup being defined by an annular wall surrounding a chamber and an end wall connecting said stem portion to said annular wall and having an open end on the bottom of said cup opposite said end wall;

(c) a follower slidably supported in said stem portion and having the lower end of said follower within said chamber, said follower being movable axially toward and away from said open end;

(d) detent means comprising a lever means pivotally mounted on said lower portion with one lever arm engageable by said follower and the end of the other said lever arm disposed to be radially movable within said chamber, respectively, away from and toward the central portion of said chamber responsive to axial movement of said follower to respectively disengage and engage such workpiece;

(e) an ejector means movably mounted on said lower end of said follower; and

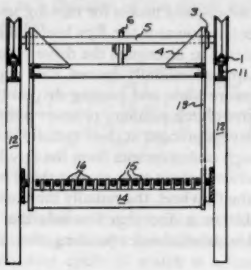
(f) means to resiliently bias said ejector means toward said cup open end.

4,116,326

VIBRATING CONVEYOR BAR CLEANING SYSTEM

David B. Tuman, Rte. 2, Box 2432, Stimpson Rd., Oroville, Calif. 95965

Filed Jun. 15, 1977, Ser. No. 806,667
Int. Cl.[2] B65G *45/00*
U.S. Cl. 198—498 **7 Claims**



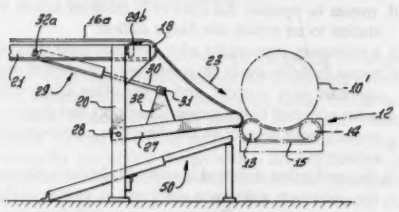
1. A vibrating conveyor bar cleaning system comprising a carriage frame having a top portion and vertical legs supporting said top portion, a carriage slidably disposed on said carriage frame top portion having depending frame elements inwardly disposed relative to said vertical legs of said carriage frame; said frame elements terminate in a transverse cross bar at the extremity remote from said top portion of said carriage frame, a plurality of parallel substantially horizontally disposed bars capable of vibratory motion, said bars being spaced from each other by a uniform distance and disposed below the top portion of said carriage frame, teeth members carried by said carriage by said transverse cross bar upwardly extending into the areas between said parallel bars to remove bits of matter entrained between said bars, and means for imparting a horizontally reciprocating motion to said carriage, whereby said teeth disposed on said carriage will traverse substantially the entire length of said vibratory bars, thereby removing entrained matter disposed between said bars along their entire extent, and the space between said carriage frame top portion and said teeth is great enough to prevent debris from jamming the sliding.

4,116,327

TRANSFER MECHANISM EMPLOYING BODILY EXTENSIBLE SLING STRUCTURE

Robert B. Eglinton, Hawthorne, and James S. Tuell, Manhattan Beach, both of Calif., assignors to Chromalloy American Corporation, New York, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,411
Int. Cl.[2] B65G *11/10*
U.S. Cl. 198—560 **13 Claims**



1. In load transfer apparatus

(a) load receiving sling means having opposite ends,

(b) support means operatively connected with at least one bodily movable end of the sling means and bodily movable

to endwise elongate the sling means into a ramp position for gravity transfer of a load off the sling means,

(c) anchor means for a fixed end of the sling means remote from said bodily movable end of the sling means, and relative to which said one end of the sling means is bodily movable between up and down positions, said support means in said down position being further from the anchor means than in said up position, and

(d) movable transfer mechanism extending into proximity to the sling means fixed end to transfer a load over said fixed end of the sling means and onto the sling means in said up position of said one end of the sling means, said transfer mechanism comprising conveyor belts extending forwardly, the sling means including multiple belts having portions secured to said anchor means in load receiving proximity to the forwardmost ends of the conveyor belts.

4,116,328

APPARATUS FOR REPLENISHING CONTAINERS FOR THIN AND FLEXIBLE COMPONENTS

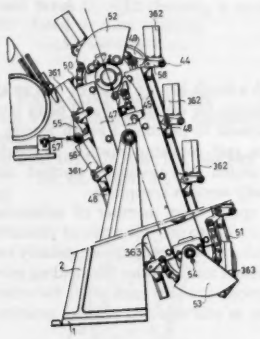
László Horváth; Ferenc Major; Ottó Gaál, and Sandor Lengyel, all of Budapest, Hungary, assignors to Egyesult Izzolampa es Villamossagi Rt., Budapest, Hungary

Filed Apr. 30, 1976, Ser. No. 682,107

Claims priority, application Hungary, May 5, 1975, EE 2327

Int. Cl.[2] B65G *47/06*

U.S. Cl. 198—648 **4 Claims**



1. An improved apparatus for replenishing depleted, relatively inaccessible and moving containers that contain thin, cut-to-size components at a rate independent of a high-velocity product output that involves the components, the apparatus comprising, in combination: a component loader of a rotary construction; a plurality of component storage containers arranged on an endless conveying device and guided for oscillating movement; a control mechanism for alternatingly moving said containers according to a predetermined timing and along a predetermined path; means for guiding said conveying device along a path which includes working positions of said containers; indexing means for intermittently advancing said conveying device; a device for controlling the operation of said indexing means; a plurality of holders for said containers, rotatably journalled on said conveying device; arms on said holders, guided along the path of said conveying device, defined by fixedly arranged straight track sections, arcuate track sections, and a track section arranged for moving alternatingly in the regions of the working positions of said containers; and means for releasably securing said containers to said holders for accurate positioning, allowing replacement of empty containers when a previous supply of filled containers is depleted.

4,116,329

SAFETY CONTAINER HAVING VENT MEANS

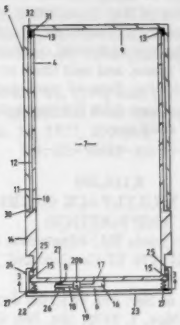
Barrie Franklin Garden, Kilgour St., Seacliff via Dunedin, New Zealand

Filed Dec. 13, 1977, Ser. No. 860,227

Claims priority, application New Zealand, Dec. 21, 1976, 182939

Int. Cl.[2] A45C *13/10, 13/18*

U.S. Cl. 206—1.5 **13 Claims**



1. A container comprising: a first part or receptacle; a second part or cap; said first part and said second part being sealingly associable to define an enclosed container space; valve means included in said first or said second part adapted to allow expulsion of air from said enclosed space upon association on said first and said second parts, but not normally allow passage of air into said enclosed space; means included within said first or second part actuable to vent said enclosed space to the atmosphere surrounding said container.

4,116,330

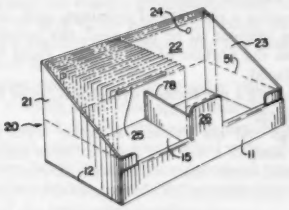
COMBINATION PACKAGE AND DISPLAY CASE

A. Barry Ellis, Glen Ellyn, Ill., assignor to Azteca Corn Products Corporation, Chicago, Ill.

Filed Aug. 29, 1977, Ser. No. 828,494

Int. Cl.[2] B65D *5/54*

U.S. Cl. 206—44 R **1 Claim**



1. A four sided shipping container for the distribution and shelf display of prepackaged articles having a display face, said shipping container being formed from a single piece blank and having a cover, said cover enclosing a base portion having a lower base portion with substantially equal wall height and an upper base portion open on one side and of a certain greater uniform height on an opposed side, each of the other two sides comprising connecting sides uniformly rising in height from said open side to said opposing side, said shipping container having perforations detachably defining said cover, said upper base portion and said lower base portion, and being convertible from a first structure for completely enclosing said prepackaged articles for shipment, to a second structure by the removal of said cover from said upper base portion along their connecting perforations, thereby exposing said display face of

said prepackaged articles on said open side, said upper base portion substantially concealing said prepackaged articles on the remaining sides, said first structure being convertible to a third structure by the removal of both of said cover and said upper base portion along their respective perforations and said second structure being convertible to said third structure by the removal of said upper base portion along its perforated connection to the lower base, said third structure displaying said prepackaged articles on all sides, each of said second and third structures capable of being formed from said first structure for use in a plurality of shelf conditions, said second structure being for the exposure of the display faces of at least two prepackaged articles for use as desired on shelves allowing for a maximum of display space, and said third structure being for the exposure of the display face of one prepackaged article along one of said connecting sides for use as desired on shelves having a minimum of shelf space.

4,116,331
HEAT INSTALLED MULTI-PACK CARRIER, MACHINE AND METHOD

Byron V. Curry, 1150 Oriole Rd., Montecito, Calif. 93108, and Teofil L. Bonkowski, 978 El Camino Ave., Stockton, Calif. 95207

Continuation-in-part of Ser. No. 583,183, Jun. 2, 1975. This application Nov. 7, 1975, Ser. No. 629,769

Int. Cl.[2] B65D *75/00*

U.S. Cl. 206—150 **13 Claims**

1. A carrier intended to interconnect an array of elements as a package, the carrier comprising:

a sheet made of a material which may be shrunk by application of an external force,

said sheet having a plurality of openings, each intended to receive an element to be packaged, the openings being larger than the portion of the element about which the sheet is placed,

said sheet having a pre-formed cylindrical collar area about each opening,

said openings and the cylindrical collar areas about the openings being of a size and shape to, upon application of said external force, contract in size sufficiently to tightly hold and interconnect the elements of the array.

4,116,332
COMBINATION BRUSH HOLDER AND CAN CONNECTOR

Daniel W. Hartley, 1829 Moss Tree Rd., North Charleston, S.C. 29406

Filed Jul. 23, 1976, Ser. No. 708,127

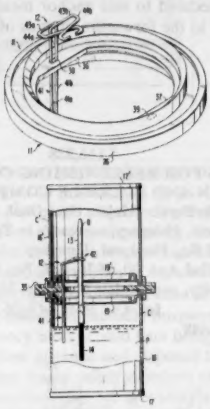
Int. Cl.[2] B65D *81/24*

U.S. Cl. 206—209 **6 Claims**

1. A combination brush holder and connector for cans of the type having a tubular body closed at one end and provided at the other end with an annular rim defining an access opening comprising, in combination;

(a) an annular body member of substantially T-shaped cross-sectional area, said body member including upper and lower vertically aligned annular flanges, an outer side wall, an inner side wall defining a central opening and an annular side flange extending radially outward from said outer side wall, at least one support flange on said inner side wall extending radially inward within said central opening, said upper and lower flanges being receivable in snug-fitting, sealing engagement within the outer rim of the top and bottom can respectively of a pair of cans arranged in vertically stacked, co-axially aligned, inverted relationship with said can access openings in adjacent relationship and with said body member side flange extending radially outward between the adjacent other ends of said stacked pair of cans, and

(b) a brush holder having an elongated body portion and a brush retaining portion for yieldable supporting engagement with a brush having a handle and an aperture in said support flange for supporting said body portion for vertical adjustment to position a brush having a handle supported on said retaining portion in a selected vertical position within said vertically stacked cans, said brush holder body portion comprises,



a folded spring wire member of substantially V-shaped configuration to provide a pair of yieldable leg portions, said folded wire member being slidably receivable vertically within said aperture for yielding movement of said leg portions towards each other for retaining said wire member in said selected vertical position in said aperture.

4,116,333
DISPENSER FOR SEWING MACHINE NEEDLES OR THE LIKE

Klaus Pavel, Eynatten, Belgium, assignor to Rhein-Nadel Maschinennadel GmbH, Aachen, Fed. Rep. of Germany

Filed Aug. 4, 1977, Ser. No. 821,776

Claims priority, application Fed. Rep. of Germany, Apr. 5, 1977, 2715192

Int. Cl.[2] B65D *85/24*

U.S. Cl. 206—380 **16 Claims**

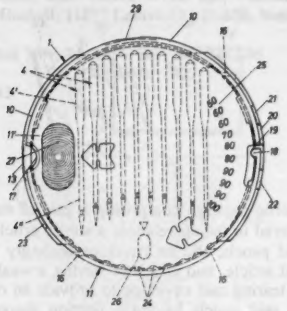
1. A dispenser for sewing machine needles or the like, comprising

a lower part formed as a circular disc and having reception shafts adapted to receive sewing machine needles, said reception shafts are arranged secant-like, said lower part defining front sided push-in cross-sections respectively opening into said reception shafts through which the needles are insertable and removable,

an upper part rotatably mounted on said lower part, said upper part having an upper part edge closing said front sided push-in cross-sections of said reception shafts in a closed rotation position of said upper part relative to said

lower part, said upper part edge defining a removal opening rotatable to a position aligned in front of said push-in cross-section of said reception shafts, respectively in open rotation positions of said upper part relative to said lower part,

said upper part is formed with a section located in a direction toward the periphery of said upper part laterally relative an outermost of said reception shafts when said upper part



is in the closed rotation position relative to said lower part, said upper part section is formed into a magnifying lens section,

said lower part is formed with a break-through opening therethrough located in a direction toward the periphery of said lower part laterally relative the outermost reception shaft, said break-through opening is under said lens section in the closed rotation position.

4,116,334

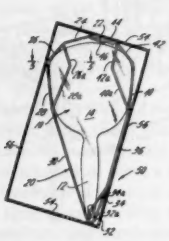
PACKAGED ARTICLES

Milton W. Herzog, Valley Stream, N.Y., assignor to H. Goodman & Sons, Inc., Kearny, N.J.

Filed Jun. 10, 1976, Ser. No. 694,896

Int. Cl.[2] B65D *85/48*

U.S. Cl. 206—453 **7 Claims**



1. A package including a merchandise unit having a peripheral surface and opposite top and bottom surfaces, and packing means including an elongated liner of stiff sheet material having parallel longitudinal edges, the width of the liner between its longitudinal edges being substantially greater than the width of said peripheral surface of the merchandise unit, said liner having a medial portion between but spaced from both of said longitudinal edges of the liner, said medial portion surrounding said merchandise unit and being divided by transverse creases into a series of panels that form successive angles buckled outward without inward-buckled angles intervening between the successive outward-buckled angles and that snugly confine the merchandise unit, said liner including further portions alongside said medial portion and bounded by said longitudinal edges, parts of said further portions of the liner forming integral lateral extensions of certain ones of said panels and other parts of said further portions of the liner forming inward buckled offsets above and below the merchandise unit, said other parts of said further portions having second longitudinal edges firmly supporting said merchandise unit against up-and-down movement in the liner.

4,116,335

FOLDING LINER FOR SHIRTS AND OTHER PACKAGED GARMENTS

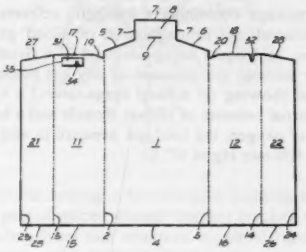
Leo Leopold, Austrasse 65, 7140 Ludwigsburg, Fed. Rep. of Germany

Filed Mar. 14, 1977, Ser. No. 777,519

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1976, 2611406; Jan. 14, 1977, 2701501

Int. Cl.[2] B65P *85/18*

U.S. Cl. 206—492 **16 Claims**



1. A folding liner for a man's shirt, or a woman's blouse, or a similar outer garment which is to be assembled with the liner by folding it around the latter into a stiff flat package for purposes of storage, shipment, or retail display, for example, the folding liner comprising in combination:

a substantially rectangular center panel of a width and length which correspond substantially to the width and length of the intended package, the center panel having a bottom side, a top side, and two straight longitudinal sides;

two likewise substantially rectangular inner wing panels having a width slightly less than one-half the width of the center panel and straight longitudinal sides, one longitudinal side of each inner wing panel being the inner side, forming a junction and a lateral fold line with a longitudinal side of the center panel;

two likewise substantially rectangular outer wing panels having a width of at least approximately 5 cm, but less than the width of the inner wing panels, and straight longitudinal sides, one longitudinal side of each outer wing panel being the inner one, forming a junction and an intermediate fold line and with the outer longitudinal side of one of the inner wing panels;

the folding liner thus comprising a succession of five panels which are joined at only four straight fold lines along which the liner material is weakened by perforations, in order for the wing panels to be readily foldable over the center panel, in a configuration in which the outer wing panels lie in-between the inner wing panels and the center panels and in which the liner is capable of clampingly retaining layers of said garment between the inwardly folded outer wing panels and their underlying inner wing panels, on the one hand, and between said folded outer and inner wing panels and the center panel, on the other hand; and

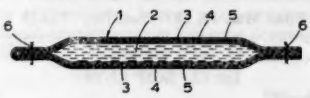
closure means for maintaining the folded wing panels in their folded position, said closure means being defined by cooperating closure members which are integral portions of the inner wing panels of the folding liner.

4,116,336

PACKAGE CONTAINING A REFERENCE LIQUID FOR BLOOD GAS EQUIPMENT

Soren Kaj Sorensen, Glostrup, and Carl Christian Holbek, Allerod, both of Denmark, assignors to Radiometer A/S, Copenhagen, Denmark

Continuation-in-part of Ser. No. 652,817, Jan. 27, 1976, abandoned. This application Mar. 1, 1977, Ser. No. 773,222
Claims priority, application Denmark, May 30, 1975, 2449/75; Jun. 17, 1976, 2724/76
Int. Cl.[2] C09K *3/00*; B65B *31/00*; B65D *81/20, 85/70*
U.S. Cl. 206—524.8 14 Claims



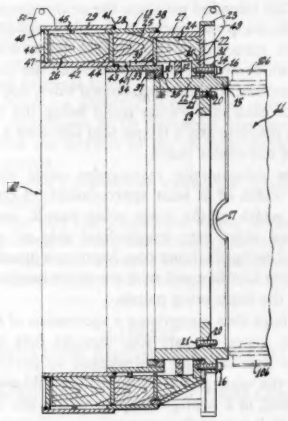
1. A package containing a synthetic reference liquid for quality control and/or calibration of blood gas measuring equipment, said liquid being enclosed in a flexible, gas-tight container without the presence of any gas phase in the container and showing (at a fixed temperature) a known pH, a known partial pressure of carbon dioxide and a known partial pressure of oxygen, the total gas pressure in said liquid being less than 600 mm Hg at 37° C.

4,116,337

IMPACT ABSORBING MEANS FOR SHIPPING CASK

Harold Adams Backus, Wynnewood, Pa., assignor to N L Industries, Inc., New York, N.Y.

Filed Apr. 29, 1976, Ser. No. 681,435
Int. Cl.[2] B65D *81/04*
U.S. Cl. 206—591 9 Claims



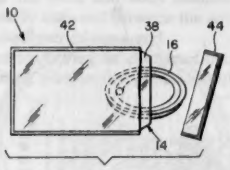
1. In a shipping cask for radio-active materials the improvement comprising impact absorbing means comprising a composite annulus of balsa wood, being a plurality of axially superimposed balsa wood rings, overlapping metal bands constructed and arranged to encase said balsa wood rings and an annular base-member, annular weldments joining adjacent pairs of said overlapping metal bands, substantially flat metal rings being freely positioned between adjacent balsa wood rings, and mounting means arranged to secure the annular base-member of said composite annulus on an end of said cask.

4,116,338

PACKAGE FOR STERILE ARTICLE

Edwin Gordon Weichselbaum, Eureka, Mo., assignor to Sherwood Medical Industries Inc., St. Louis, Mo.

Filed Sep. 30, 1977, Ser. No. 838,422
Int. Cl.[2] B65D *19/02*
U.S. Cl. 206—610 17 Claims



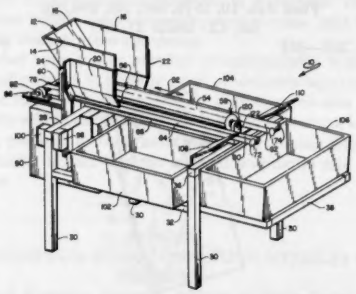
1. A sterile package comprising a pair of sterile panels of sheet material in facing relation, a sterile article disposed between said panels, and an envelope sealingly enclosing said panels and article, said envelope having a weakened area for manually tearing said envelope to provide an opening in said envelope, said panels having a portion thereof immovably restrained relative to said envelope before and after said envelope is opened, said panels extending longitudinally across the edge of said opening in said envelope after it is opened so that when said article is removed from between said panels it will not contact said envelope.

4,116,339

SORTING SYSTEM AND APPARATUS

Robert G. Holmes, Columbus, Ohio, assignor to Ohio Agricultural Research and Development Center, Wooster, Ohio

Filed Mar. 17, 1977, Ser. No. 778,794
Int. Cl.[2] B07C *1/00*
U.S. Cl. 209—699 41 Claims



1. Sorting apparatus for objects exhibiting identifiable dynamic response to vibrational phenomena comprising:

means for introducing a quantity of said objects at the entrance location of a sorting zone extending along a given longitudinal axis;

means defining an oscillatory surface within said zone and extending along said longitudinal axis;

drive means including a dynamically balanced rotative drive member actuable to impart oscillation of predetermined frequency and amplitude characteristics to said oscillatory surface;

transporter means including a conveyer surface within said zone extending from said entrance location in parallel relationship with said longitudinal axis and adjacent said oscillatory surface for sequentially moving said objects within said zone in orientations promoting the kinetic reaction thereof with said oscillatory surface;

means adjacent said zone for receiving reacted said objects exhibiting predetermined dynamic response characteristics to said kinetic reaction; and

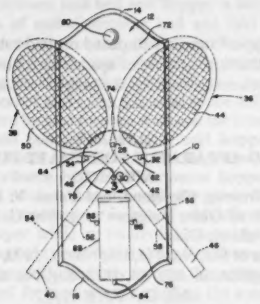
means for simultaneously actuating said drive means and said transporter means.

4,116,340

GAME EQUIPMENT HOLDER

Marvin H. Nelson, 4600 Sierra Wood La., Pleasanton, and Georgia R. Minshall, 11577 Ladera Ct., Dublin, both of Calif. 94566

Filed Nov. 24, 1976, Ser. No. 744,886
Int. Cl.[2] A47F 7/00
U.S. Cl. 211—13 **5 Claims**



1. A racket game equipment holder for positioning at least a first and second racket in criss-cross fashion, each of the rackets having one and another sides and compactly positioning a cannister in relation to the rackets comprising:

a. backing means for presenting a surface;

b. a first member fixed to said backing means and extending outwardly therefrom;

c. a second member fixed to said backing means and extending outwardly therefrom, said second member intended for bearing on one side of a first game racket and another side of a second game racket, said second member vertically spaced lower than said first member on said backing means, said first member's extention outwardly from said backing means occuring between the first and second racket;

d. a third member fixed to said backing means and extending outwardly therefrom, said third member horizontally spaced from said second member, said first member and said third member adapted to form a channel narrower than the widest dimension of the head of the first racket;

e. a fourth member fixed to said backing means and extending outwardly therefrom, said fourth member horizontally spaced from said second member, said third member and said fourth member lying on opposite sides of a line on the surface of said backing means connecting the points of contact of said first and fourth member with said backing means, said first and fourth member with said backing means, said first and fourth members adapted to form a channel narrower than the widest dimension of the head of the second racket;

f. a fifth member fixed to said backing means and extending outwardly therefrom, said fifth member intended for bearing on a cannister; and

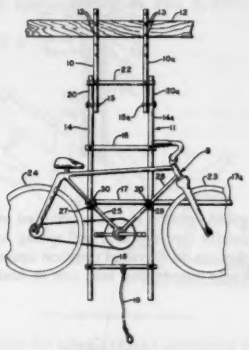
g. a sixth member and seventh member fixed to said backing means and extending outwardly therefrom, said sixth and seventh members forming a channel wider than a selected dimension of the cannister; said fifth, sixth, and seventh members positioned to lie between the racket handles of the first and second rackets to compactly support the cannister substantially between the racket handles, adjacent said backing means.

4,116,341

DEVICE FOR STORING BICYCLES IN A BUILDING

Thomas Hebda, 235 Vance, Lombard, Ill. 60148

Filed Jul. 16, 1976, Ser. No. 705,927
Int. Cl.[2] A47F 7/00
U.S. Cl. 211—17 **3 Claims**



1. A device for storing a bicycle in a building structure comprising a pair of spaced straight vertical brackets attached to and depending from said structure, a pair of rigid spaced straight standards, said standards being in the same plane as said brackets when said standards are in vertical position, a pair of pins each extending through one of said standards and one of said brackets at a point spaced below the upper end of said standards when said standards are in a vertical position to thereby pivotally attach said standards to said brackets, a rigid cross piece extending horizontally across and attached to the front of said brackets and extending in front of the upper end portions of said standards to thereby prevent rearward movement of said standards about their pivots but permit forward movement of said standards about their pivots from a vertical position forwardly to a horizontal position, and means for clamping the frame of a bicycle to said standards when said standards are in vertical position whereby said bicycle is turned to a horizontal position when said standards are turned to a horizontal position.

4,116,342

BILLIARDS CUE HOLDER

John W. Winfree, Jr., 1502 S. Virginia St., Hopkinsville, Ky. 42240

Division of Ser. No. 639,895, May 19, 1976, Pat. No. 4,079,839. This application Aug. 3, 1977, Ser. No. 821,397
Int. Cl.[2] A44B 21/00
U.S. Cl. 211—68 **1 Claim**

1. A holder for a billiards cue having a tip portion of predetermined diameter, comprising:

(a) a pair of opposed jaw members,

(b) each of said jaw members having a soft resilient gripping surface, said gripping surfaces opposing each other,

(c) a coil spring member having a substantially straight coil axis and opposite end portions,

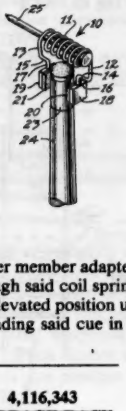
(d) said opposite end portions of said coil spring member comprising spaced apart and depending arms, each of said depending arms having a lower portion,

(e) each jaw member being fixed to a corresponding lower portion so that said opposed jaw members are spaced apart in a direction substantially parallel to said coil axis,

(f) said jaw members being biased by the force in said coil spring to a normally inoperative position in which the

distance between said opposed jaw members is less than the diameter of the tip portion of a cue to be held between said jaw members,

(g) said coil spring being yieldable to permit said opposed jaw members to be spread apart by said tip portion to an operative position gripping said tip portion to freely suspend said cue,



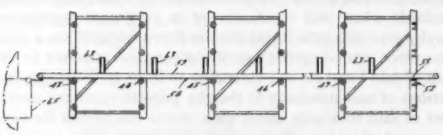
(h) an elongated fastener member adapted to extend substantially coaxially through said coil spring for mounting said jaw members in an elevated position upon a support member for freely suspending said cue in said operative position.

4,116,343

STORAGE RACK

Lee Z. Hall, Detroit, Mich., assignor to Palmer-Shile Company, Detroit, Mich.

Filed Aug. 18, 1977, Ser. No. 825,567
Int. Cl.[2] A47F 3/06
U.S. Cl. 211—151 **2 Claims**



1. A storage rack comprising a plurality of elongated front to rear openings in vertically arranged relation, a plurality of cassettes insertable in said openings, each cassette comprising an elongated frame with a pair of bottom rails, each opening having a series of transverse rollers, said series extending from front to rear, each roller being supported on anti-friction bearings, and a locking beam extending across the rear of each opening, said locking beam having a convex upper surface the highest point of which is slightly above the level of said rollers, the rearward end of each cassette having means engageable with said said locking beam as the cassette is inserted to cause said cassette to ride up onto the locking beam to create a frictional locking force between the locking beam and cassette.

4,116,344

FLUID PALLET AND A METHOD OF STACKING AND STORING GOODS

Theodore J. Ziemba, 806 W. 17th St., Hastings, Nebr. 68901

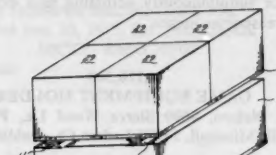
Filed Aug. 23, 1976, Ser. No. 716,613
Int. Cl.[2] B65G 1/14
U.S. Cl. 214—10.5 D **9 Claims**

1. A pallet comprising:

at least two parallel elongated inflatable, flexible tubes;

each tube being formed with side walls, end walls, a top wall and a bottom wall and is hexahedronally shaped in a cross-sectional view which is transverse to the longitudinal axis of the tube; a conduit being fluidly connected to each tube;

each conduit having a valve mounted therein for permitting the passage of fluid therethrough, thus allowing said tube to be inflated and deflated; and



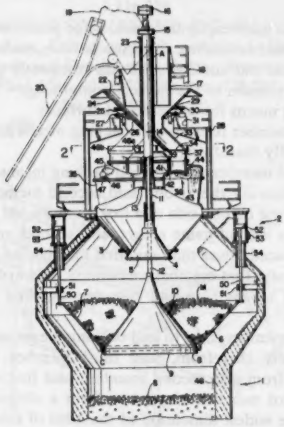
a rigid support member disposed on said tubes for receiving goods thereon, said tubes spaced apart to form a passage therebetween extending the length of said tubes.

4,116,345

CHARGING APPARATUS FOR SHAFT FURNACES AND METHOD

Melvin J. Greaves, Cleveland, and Frank V. Razgaitis, Seven Hills, both of Ohio, assignors to Arthur G. McKee & Company, Cleveland, Ohio

Continuation of Ser. No. 411,924, Nov. 1, 1973, abandoned. This application Aug. 13, 1975, Ser. No. 604,328
Int. Cl.[2] F27B 11/12
U.S. Cl. 214—37 **15 Claims**



1. In apparatus for charging particulate material into a shaft furnace in which a substantial pressure of gas is maintained during operation of said furnace which furnace comprises a furnace portion having an upright inner furnace wall providing a periphery defining a cross sectional space in the furnace into which said material is to be deposited and gas lock means permitting introduction of said material into the upper portion of said space without harmful loss of gas pressure; distributor means in said space below said gas lock means comprising a distributor bell having an upper surface that converges upwardly and inwardly from a perimeter of said bell at the lower edge of said upper surface which is the largest perimeter of said bell, a distributor hopper surrounding said bell and having an upper surface that converges downwardly and inwardly said hopper having an opening adjacent the lower edge of said inner surface through which said bell may freely pass, the clearance space between the edge of said opening and said bell perimeter when said bell perimeter is in said opening being

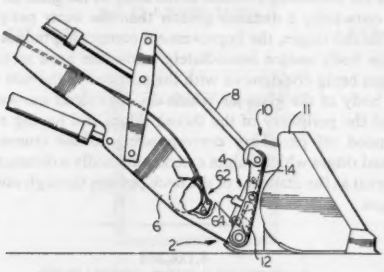
wide enough so that particulate material may freely pass through said space without jamming the bell in said opening, means for causing relative movement between said bell and said hopper along an upright path extending between a lower position in which the bell is located with its said bell perimeter a substantial distance below said hopper opening so particulate material deposited in said hopper passing through said hopper opening is directed by said upper surface of said bell toward said inner furnace wall, and an upper position in which said bell is located with its said bell perimeter a substantial distance above said hopper opening so particulate material deposited in said hopper and passing through said hopper opening is directed by said inner surface of said hopper to a location under the bell and away from said furnace wall; and means for discharging particulate material into said hopper while said relative movement between said bell and hopper is occurring, the space below ech of said distributor bell and said distributor hopper being free of any means, other than the bell, that can deflect toward said furnace wall particulate material passing through said opening of said distributor hopper, and the cross sectional dimension of said cross sectional space defined by the periphery provided by said furnace wall and the cross sectional dimensions of said bell perimeter and said hopper opening being so proportioned and related, and said converging surfaces of said distributor bell and distributor hopper being so proportioned and related, that although the space beneath said distributor bell and said hopper is free of said deflecting means, said bell and hopper while so relatively moved between said positions in said upright path can directly distribute said particulate material essentially entirely across the cross section of said cross sectional furnace space including the areas between the periphery of said space and the center of said space.

4,116,346

QUICK COUPLER

Tomio Uchida, Sapporo, Japan, assignor to Caterpillar Mitsubishi Ltd., Tokyo, Japan

Filed Jan. 31, 1977, Ser. No. 763,786
Claims priority, application Japan, Feb. 24, 1976, 51-018413
Int. Cl.[2] E02F *3/81*
U.S. Cl. 214—145 A **5 Claims**



1. A quick coupler for attaching and detaching an implement to and from a vehicle equipped with a lift arm and a tilt link, comprising:

a hitch including a lower supporting assembly having a lower engaging member and being pivotally connected to said lift arm, an upper supporting assembly having an upper engaging member and being pivotally connected to said tilt link, said lower and upper supporting assemblies being pivotally connected and moveable between an over-center locking position and an angularly collapsed and disengaged position, and having means for urging said lower and upper supporting assemblies together, said lower engaging member being freely rotatably supported on said lower supporting assembly and having a substantially rectangular cross sectional configuration; and

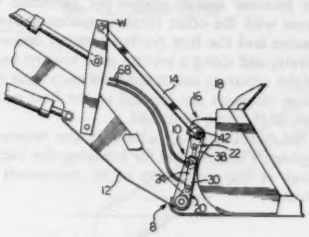
a hook arrangement secured to the implement and having a lower hook portion and an upper hook portion respectively receiving said lower and upper engaging members therein with said means maintaining said upper and lower supporting assemblies at said over-center locking position.

4,116,347

QUICK COUPLER

Tomio Uchida, Sapporo, Japan, assignor to Caterpillar Mitsubishi Ltd., Tokyo, Japan

Filed Jan. 31, 1977, Ser. No. 764,139
Claims priority, application Japan, Feb. 3, 1976, 51-009960
Int. Cl.[2] E02F *3/81*
U.S. Cl. 214—145 A **10 Claims**



1. A quick coupler for attaching and detaching an implement to a vehicle equipped with a lift arm and a tilt link, comprising:

a hook arrangement having a lower hook portion and an upper hook portion and being secured to the implement; and

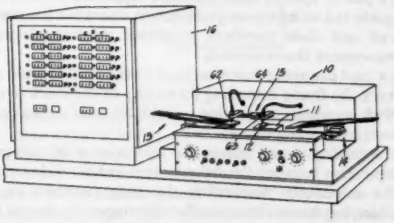
a hitch having a lower supporting assembly pivotally connected to the lift arm on a lower axis, an upper supporting assembly pivotally connected to the tilt link and pivotally connected to said lower supporting assembly on an upper axis, and an actuator pivotally connected between the supporting assemblies and being movable between an extended position and a retracted position, said lower and upper supporting assemblies being positioned between a substantially aligned first condition of reception in said lower and upper hook portions and an angularly collapsed second condition at said extended and retracted positions, said actuator having a central axis disposed forwardly of a plane passing through said lower and upper axes when said supporting assemblies are in said substantially aligned first condition.

4,116,348

COMPONENT LOCATING APPARATUS

Raymond D. Atchley, Los Angeles; John E. Barr, Brea, and John B. Pegram, Los Angeles, all of Calif., assignors to Deval Industries, Inc., Los Angeles, Calif.

Filed Jul. 19, 1976, Ser. No. 706,570
Int. Cl.[2] B65G *47/91*
U.S. Cl. 214—309 **9 Claims**



1. Apparatus for locating components of different kinds on a substrate surface, comprising:

first and second magazines arranged in mutually spaced relation;

a plurality of elongated trays arranged in two sets on said first and second magazines in side-by-side relation, each tray including a plurality of components in end-to-end arrangement along the tray length;

a table carrying the substrate situated between said first and second magazines;

a pair of vacuum retainers mounted in fixed spaced relation on a plate;

means for moving said plate and vacuum retainers along a first path from a first extreme with one of said vacuum retainers disposed spaced above the first magazine and the other retainer spaced above the substrate to a second extreme with the other retainer spaced above the second magazine and the first recited retainer spaced above the substrate, and along a second path toward and then away from the substrate and magazines each time the plate and vacuum retainers are located at the first and second extremes of the first path; and

means for establishing a vacuum in the retainers to secure components thereto and for breaking the vacuum in each retainer at the conclusion of its movement toward the substrate.

4,116,349

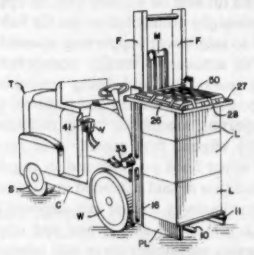
FORK LIFT LOAD CLAMPING AND STABILIZING DEVICE

Harvey E. Durham, Box 164, Manila, Ark. 72442

Filed Apr. 7, 1977, Ser. No. 785,633

Int. Cl.[2] B66F *9/18*

U.S. Cl. 214—654 **4 Claims**



1. A load clamping and stabilizing device for attachment to the fork mounting carriage of a fork lift truck having a source of power, the carriage being guided and power driven for elevational movement in an upright lift frame supported on the forward end of the truck and having fork members extending forwardly from the carriage, the device comprising:

(a) a pair of upright guide rail members spaced transversely of the truck and disposed upright parallel to the lift frame, and each guide rail member being attached to and supported by said carriage for elevational movement therewith;

(b) a pair of upright slide members supported parallel to the guide rail members on guide rollers operative between the rail and slide members to permit relative elevational movement therebetween;

(c) a load clamping frame secured to the upright slide members, the frame extending forwardly of the truck over the fork members and having a yieldable load engaging web in the clamping frame;

(d) actuating means driven by said source of power and operative between the rail members and the slide members for selectively positioning the slide members and the clamping frame elevationally with respect to the rail members and the fork mounting carriage; and

(e) each upright guide rail member supporting a bearing aligned transversely of the truck with a bearing supported in the other upright rail member; a shaft journaled in said bearings, the shaft and bearings being offset rearwardly of the truck on the other side of the rail members from the fork members and spaced from the slide members; each slide member having rearwardly facing edges provided with rack teeth extending toward the shaft; pinion means fixed on the shaft and engaging the rack teeth on each slide member; and said actuating means including a reversible motor coupled to rotate the shaft and connected by control means to said source of power.

4,116,350

GLASS JAR WITH THREAD PROTECTOR

Alberto Allasia, New York, N.Y., assignor to Ferrero Nahrungs- und Genussmittel GmbH, Frankfurt am Main, Germany

Continuation of Ser. No. 696,659, Jun. 16, 1976, abandoned. This application Aug. 12, 1977, Ser. No. 824,140

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1975, 7521179[U]

Int. Cl.[2] B65D *1/02*

U.S. Cl. 215—31 **1 Claim**

1. In a glass jar of the type for receiving food products having a cylindrical neck section provided with thread ridges adapted to receive a screw cap thereon and a body section having side walls, at least a portion of which do not extend outwardly beyond the external periphery of said thread ridges with the remaining portions of the body of the glass jar extending outwardly a distance greater than the outer periphery of the thread ridges, the improvement comprising bulges located in the body section immediately below the neck section, said bulges being coextensive with the portions of the side walls of the body of the glass jar which do not extend outwardly beyond the periphery of the thread ridges and having a curved rounded off periphery corresponding to the course of the thread ridges which bulges extend outwardly a distance at least as great as the diameter of the neck portion through said thread ridges.

4,116,351

SAFETY CLOSURE CONTAINER

Gerhardt E. Uhlig, 5111 Secor Rd. - Secor Cedars Apt. #9, Toledo, Ohio 43623

Division of Ser. No. 475,593, Jun. 3, 1974, Pat. No. 3,984,021, which is a division of Ser. No. 288,129, Sep. 11, 1972, Pat. No. 3,830,391, which is a continuation of Ser. No. 16,427, Mar. 4, 1970, abandoned. This application Oct. 4, 1976, Ser. No. 728,938

Int. Cl.[2] B65D *55/02, 85/56;* H61J *1/00*

U.S. Cl. 215—216 **5 Claims**

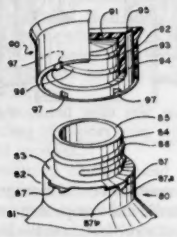
1. The combination of a container and closure which comprises:

a container having an upstanding neck defined opening, said neck having closure attachment means formed on the exterior surface thereof and a plurality of depending, readially spaced stop projections proximately below said attachment means,

a closure including a top wall spanning said opening of said container, an inner depending skirt marginally connected to said top wall having attachment means formed thereon

which are rotationally, releasably engageable with said attachment means on said neck of said container, said top wall fluidly sealing said opening when said attachment means on said container and closure are fully rotationally engaged, an outer depending skirt surrounding said first skirt and connected at the top by a flexible web, said second skirt including a plurality of radially spaced stop projections,

said stop projections being selected and cooperatively lo-



cated for coincident registration and releasable locking of said closure to said container when said top wall assumes fluid-sealed relationship with said opening, precluding accidental, non-purposeful, rotational removal of said closure,

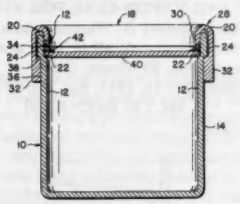
said outer closure skirt being movable downwardly responsive to manually applied pressure on said outer skirt, thereby temporarily deflecting said web from its normal position to thereby disengage said stop projections, permitting coincident rotational removal of said closure.

4,116,352

SEALING DEVICE

Charles S. Davis, Antioch, Calif., assignor to Leonard Russo, San Rafael, Calif., a part interest

Filed Nov. 1, 1976, Ser. No. 737,762
Int. Cl.² B65D *53/00*
U.S. Cl. 215—270 **4 Claims**



1. Sealing structure for a pressure-type containment vessel comprising:

a container;

a resilient lid disk;

a retaining ring; and

an elastomeric O-ring;

said container comprising a mouth, an interior wall, an exterior wall, an annular shoulder disposed along said interior wall, and at least one flange along said exterior wall;

said lid disk being adapted to seat against said interior wall shoulder;

said retaining ring comprising a continuous annular ridge for opposing said interior shoulder and at least one ring flange adapted to engage said container flange;

said O-ring being deformable and sealably compressible between said lid disk, said confronting ridge and said interior wall for sealing said container upon engagement between said ring flange and said container flange;

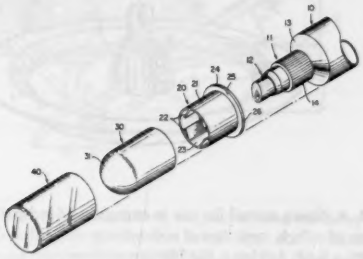
said ring ridge being tapered to present an at least partially radially disposed margin for engaging said O-ring, whereby said O-ring is urged into tighter sealable contact with said interior wall and with said lid disk upon outward axial flexure of said lid disk.

4,116,353

SELF-CENTERING ROTATABLE CLOSURE RETAINER

William Peter Schwabacher, Wharton, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Feb. 18, 1977, Ser. No. 770,250
Int. Cl.² B65D *45/32*
U.S. Cl. 215—274 **2 Claims**



1. A self-centering rotatable closure retainer in combination with a cylindrical axially serrated cap comprising:

(a) a substantially annular collar; and

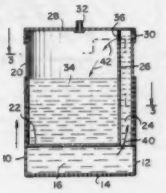
(b) four axially elongated flexible ribs inwardly mounted to the collar so that the ribs tangentially engage the outer wall of the cap to frictionally secure the retainer on the cap, the ribs extending past the point of tangency with the cap and being substantially symmetrically positioned to the collar inner wall so that opposing ribs extend radially inwardly toward the inner ends of one another to permit centering of the cap and free rotation of the retainer around the cap.

4,116,354

TWO CHAMBERED MIXING CONTAINER

Divaker B. Kenkare, South Plainfield; Robert T. Hall, II, Trenton, and John C. Carson, Jr., Manasquan Park, all of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

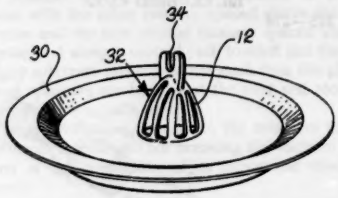
Filed Jan. 24, 1977, Ser. No. 761,845
Int. Cl.² B65D *1/24*
U.S. Cl. 220—20 **3 Claims**



1. A mixing container comprising a first container defining a first chamber for receiving a first substance, a second container adapted to telescopingly fit within said first chamber and defining a second chamber for receiving a second substance, and means for communicating said first and second chambers to allow mixing of the first and second substances when said second container is pushed into said first container, said means including an upwardly extending channel shaped groove provided in the side wall of said second container and an opening

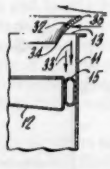
through said side wall communicating with said first chamber and disposed at the upper part of said groove.

4,116,355
DINING UTENSIL
John W. Munn, and Kevin J. Munn, both of 4815 Montibello Dr., Charlotte, N.C. 28211
Filed Oct. 7, 1976, Ser. No. 730,656
Int. Cl.[2] A47J *43/28*; B65D *7/42*
U.S. Cl. 220—83 **5 Claims**



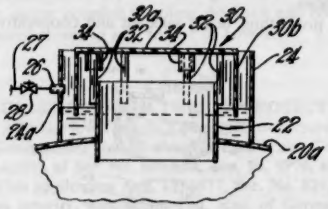
1. A dining utensil for use in engaging a food particle on the tines of a fork, said utensil comprising:
(a) a base, having a flat bottom surface;
(b) a multiplicity of vertical ribs connected to said base and meeting at their upper ends to form a vertex, each of said ribs extending at least partially radially outward from said base; and
(c) a pair of horizontally spaced, substantially parallel upstanding members fixed to the vertex of said utensil and spaced apart slightly more than the spacing of the tines of a fork to be used therewith.

4,116,356
FLOATING TANK ROOF IMPROVEMENT
Hayden J. Silver, Jr., Poughkeepsie, and James H. Stackhouse, Jr., Hopewell Junction, both of N.Y., assignors to Texaco Inc., New York, N.Y.
Filed Jun. 10, 1977, Ser. No. 805,258
Int. Cl.[2] B65D *25/00, 87/18*
U.S. Cl. 220—85 R **7 Claims**



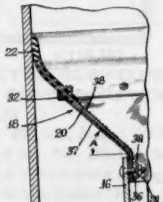
1. In combination with a large open top tank having a floating type roof covering the fluid contained therein,
means for equalizing air pressure differentials on the edges of said roof caused by wind across said open top, comprising
an annular airfoil strip for diverting said wind downward onto said roof along the windward edge of said open top, said annular airfoil strip comprising
a downward sloping surface having a trailing edge extending radially inward a limited amount relative to said tank open top.

4,116,357
TANK WITH WATER-SEALABLE VENT
Marion L. Stanley, Jr., Toledo, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Filed Aug. 22, 1977, Ser. No. 826,581
Int. Cl.[2] B65D *51/16, 53/06*
U.S. Cl. 220—205 **4 Claims**



4. A corrosion resistant vented storage tank formed of glass fiber reinforced plastic and comprising a tank having a top wall portion, a first tubular projection extending upwardly from the top wall portion and communicating with the inside of the tank, a second tubular projection of larger diameter than that of the first, the second tubular projection being mounted on the outside of the top wall portion in concentrically spaced relationship to the first tubular projection, the tubular projections and the portion of the top wall portion therebetween providing an annular container for water, a cap including a flat circular unvented closure portion and a depending annular skirt portion of a diameter intermediate those of the tubular projections, the skirt portion being disposed in concentrically spaced relationship to the tubular projections, and cooperative slidingly engageable vertically extending rod and sleeve means on the cap and on the first tubular projection reciprocably mounting the cap with respect to the tubular projections and maintaining the closure portion of the cap in spaced relationship from the outer end of the first tubular projection and the lower end of the annular skirt in spaced relationship from the top wall portion of the tank.

4,116,358
WEATHER AND VAPOR SEAL FOR STORAGE TANK
John S. Kinghorn; Robert B. Wagoner, both of Houston, and Alfred J. Turala, Seabrook, all of Tex., assignors to Aerojet-General Corporation, El Monte, Calif.
Filed May 16, 1977, Ser. No. 797,465
Int. Cl.[2] B65D *87/20*
U.S. Cl. 220—222 **15 Claims**



1. In a storage tank having a cylindrical wall and a floating roof spaced from the wall by a rim space having a dimension between the wall and the roof which varies about an average dimension, a combined weather and vapor seal for covering the rim space, comprising:
a flexible shield comprising a plurality of adjacent flexible shield sections disposed around the perimeter of the roof

and substantially completely covering the rim space, each such shield section having a first end rigidly connected to an upper portion of the floating roof and a second end extending toward the wall of the storage tank;

flexible means supported from said shield for engaging the inner surface of the wall, the combination of said shield and said flexible means disposed to extend from the upper portion of the roof to the wall at an acute angle A with respect to the horizontal, and each shield section having, when unflexed, a substantially linear dimension in the direction of its intended extension from the roof toward the wall which is greater than the average rim space dimension divided by the cosine of the angle A, such that, upon installation in the tank, each shield section flexes along its linear dimension to urge said flexible means against the tank wall; and

vapor seal means associated with said shield sections for preventing the escape of vapors from within the tank and between the shield sections,

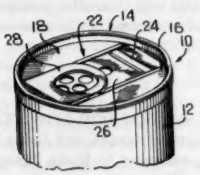
whereby the dimensioning of the shield ensures that the flexible means remains firmly pressed against the tank wall as the rim space varies so as to inhibit the release of vapors from the interior of the tank and to protect the interior of the tank from atmospheric contaminants, and said vapor seal means further inhibits the loss of vapors from the interior of the tank to the atmosphere.

4,116,359

THROUGH HOLE DEFORMATION AND INSIDE SEALING TEAR STRIP

Karl Josephy, Los Angeles, Calif., assignor to The Continental Group, Inc., New York, N.Y.

Filed Oct. 21, 1977, Ser. No. 844,183
Int. Cl.[2] B65D *41/02, 41/32*
U.S. Cl. 220—265 **12 Claims**



9. An easy opening container unit comprising a container member having an inner surface and an opening therethrough, said container member having a protective coating on the inner surface thereof, a laminated tear strip temporarily closing said opening, said tear strip including an inner layer of plastics material, said tear strip being releasably bonded to the exterior of said container member with a portion of said tear strip being extruded through said opening, and at least the plastics layer being folded radially outwardly around said opening and bonded to said protective coating to seal said opening and mask any defects which may exist in said protective coating surrounding said opening.

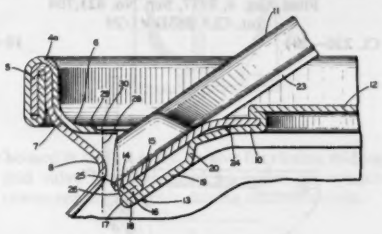
4,116,360

CAN END WITH PROTECTIVE FOLD

Bernard J. McKernan, Massillon, and Donald E. Stargell, North Canton, both of Ohio, assignors to Van Dorn Company, Cleveland, Ohio

Filed Feb. 28, 1972, Ser. No. 229,678
Int. Cl.[2] B65D *41/32*
U.S. Cl. 220—273 **5 Claims**

1. Easy opening metal food products can construction including a metal can body, an end wall, double seam means connecting the end wall to the can body; an inwardly projecting annular bead formed in the can body side wall below the seam means; the end wall having a recessed corner located below the seam, and having a recessed portion extending from said corner; the end wall recessed corner being seated on said bead; an end-panel-defining continuous score line formed in the recessed portion close to the recessed corner; the inward projection of the bead being located radially inward of the profile of that portion of the end wall remaining on the can body after the end panel has been torn from the can on the score line; pull tab means secured to the end panel for tearing the end panel from the end wall; a protective three-layer fold formed in the end wall extending completely around and underlapping the score line; the fold comprising a first metal layer extending annularly inwardly from the score line and



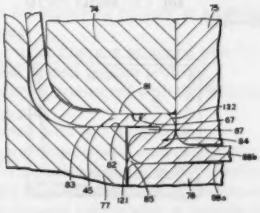
terminating in a reverse bend from which a second metal layer extends outwardly beneath the first metal layer and terminating in a second reverse metal bend from which a third metal layer extends inwardly beneath the first and second layers and into a main end panel portion of the end wall; the second reverse bend extending circumferentially outwardly beyond and below the location of the score line; the third metal layer extending inwardly to an offset panel portion; the offset panel portion merging by an angular wall portion into the main panel portion and forming an annular channel surrounded by the protective fold; and the main panel portion lying in the plane of the first fold layer.

4,116,361

FOLDED CAN END PRODUCT

Donald E. Stargell, North Canton, Ohio, assignor to Van Dorn Company, Cleveland, Ohio

Division of Ser. No. 299,447, Oct. 20, 1972, Pat. No. 3,871,314. This application Dec. 13, 1974, Ser. No. 532,588
Int. Cl.[2] B65D *41/32*
U.S. Cl. 220—273 **18 Claims**



1. In a metal can end of a type which is adapted to be seamed to a can body, in which the can end has a seam flange and a recessed corner located below the seam flange, in which a recessed portion extends inward from the corner, in which an annular three layer fold extends continuously around the recessed portion adjacent said corner, in which there is an inwardly convex upper reverse bend between the top two layers of the three layer fold and an outwardly convex lower reverse bend beneath the upper layer and between the lower two layers of the three layer fold, in which there is a continuous score line in the top surface of the top fold layer located radi-

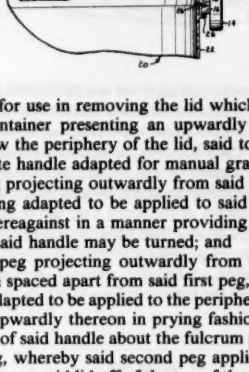
ally between the upper and lower reverse bends, and in which a pull tab has rivet connection with the recessed portion and has a nose located adjacent the score line; the improvement including a sector of the three layer fold extending on either side of a center line for the pull tab running through the pull tab rivet connection and nose having a thickness greater than the thickness of the remaining extent of the continuous three layer fold.

4,116,362

LID LIFTING TOOL FOR SHIPPING CONTAINERS

Warren Skinner, 520 Delphi, Sheridan, Wyo. 82801

Filed Aug. 4, 1977, Ser. No. 821,704
Int. Cl.[2] B65D *43/26*
U.S. Cl. 220—284 **10 Claims**



1. A tool for use in removing the lid which is tightly fit on top of a container presenting an upwardly facing shoulder spaced below the periphery of the lid, said tool comprising:

an elongate handle adapted for manual grasping;

a first peg projecting outwardly from said handle, said first peg being adapted to be applied to said shoulder and to bear thereagainst in a manner providing a fulcrum about which said handle may be turned; and

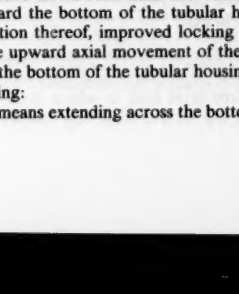
a second peg projecting outwardly from said handle at a location spaced apart from said first peg, said second peg being adapted to be applied to the periphery of said lid and to act upwardly thereon in prying fashion in response to turning of said handle about the fulcrum provided by said first peg, whereby said second peg applies a lifting force acting to pry said lid off of the top of the container as said handle is turned about said second peg.

4,116,363

SECURING MEANS FOR COOKING VESSELS

Fred E. Baker, Asheboro, N.C., assignor to General Electric Company, Bridgeport, Conn.

Filed Oct. 25, 1977, Ser. No. 845,430
Int. Cl.[2] B65D *25/10*
U.S. Cl. 220—448 **7 Claims**



1. In a cooking vessel including a tubular housing having a normally vertical axis, an inner receptacle coaxially nested within the tubular housing from the top thereof, and means preventing relative downward axial movement of the inner receptacle toward the bottom of the tubular housing beyond the nested position thereof, improved locking means for preventing relative upward axial movement of the inner receptacle away from the bottom of the tubular housing, said locking means comprising:

bottom wall means extending across the bottom of the tubular housing, said bottom wall means having an upper surface axially spaced from the bottom of the inner receptacle when the inner receptacle is in the nested position and a lower surface remote from the inner receptacle,

said bottom wall means having an opening extending therethrough between said upper and lower surfaces thereof,

a first resilient locking member secured to a lower portion of inner receptacle,

said first locking member having a portion thereof and projecting downwardly through the opening in said bottom wall means only when said first locking member is substantially resiliently deformed axially downwardly from the inner receptacle, and

a second locking member having a predetermined dimension substantially greater than a respective predetermined dimension of the opening in said bottom wall means,

said bottom wall means having a recess in the lower surface thereof crossing said opening, the configuration of said recess mating with that of said second locking member such that said locking member being received in said recess, and said recess being oriented such that the predetermined dimension of said second locking member intersects the respective dimension of said opening when said second locking member is received in said recess,

the portion of said first locking member projecting downwardly through the opening when first locking member is substantially resiliently deformed downwardly to receive said second locking member,

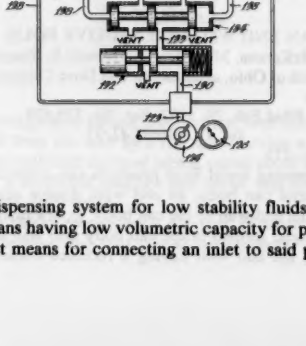
whereby the locking means being assembled during the application of downwardly directed external axial force to said first locking member sufficient to substantially resiliently deform said first locking member, and whereby upon the release of such external axial force said first locking member will bias said second locking member into said recess and will thereafter resiliently prevent relative upward axial movement of the inner receptacle away from the bottom of the tubular housing.

4,116,364

DISPENSING SYSTEM FOR LOW STABILITY FLUIDS

Samuel W. Culbertson, Arvada, and James W. Polstra, Boulder, both of Colo., assignors to Binks Manufacturing Company, Franklin Park, Ill.

Filed Feb. 2, 1976, Ser. No. 654,699
Int. Cl.[2] B67D *5/46*
U.S. Cl. 222—40 **19 Claims**



1. A dispensing system for low stability fluids comprising pump means having low volumetric capacity for pumping said fluid, inlet means for connecting an inlet to said pump means

with original containers of a low stability fluid and for maintaining the fluid free of contamination and in an unpressurized state, outlet means for said pump means, motor means operatively connected to said pump means for operating said pump means to draw fluid from the fluid container into the pump means and to pressurize the fluid in the pump means and outlet means, whereby the source of supply of the fluid is not pressurized and only a small incremental quantity of the fluid is pressurized at any given time, and means for disabling said pump means in the event of development of a predetermined excessive pressure in said pump means, said means for disabling said pump means comprising a releasable connection between said motor means and said pump means for disconnecting said pump means for said motor means without damage to either, said pump means including a pump chamber of low volumetric capacity, a contiguous chamber which is normally not in communication with said pump chamber, and a pumping member in said pump chamber connected with said motor means through said releasable connection and separating said pump chamber from said contiguous chamber, said releasable connection between said motor means and said pump means upon releasing accommodating movement of said pumping member out of said pump chamber and into said contiguous chamber to establish communication between said chambers thereby to instantly and substantially increase the effective volume of the pump chamber and effectively reduce the excessive pressure.

4,116,365

METHODS OF PREPARING BLEACH PASTE FOR AND APPLYING IT TO HAIR

Shila Morganroth, 1225 Waterbury Rd., Highland, Mich. 48031

Division of Ser. No. 579,012, May 19, 1975, which is a continuation-in-part of Ser. No. 481,695, Jun. 14, 1974. This application May 21, 1976, Ser. No. 688,596

Int. Cl.[2] **B65D** *35/44*

U.S. Cl. 222—92 **2 Claims**

1. A method of preparing a bleach paste of liquid developer and personally obnoxious dusting bleach powder which comprises prepackaging a unit quantity of powdered bleach in a flexible plastic bag having an opening in the wall thereof, said bag having a thin wall capable of being kneaded, introducing into said bag through said opening a quantity of liquid developer sufficient to convert the powder into paste of proper consistency for spreading on hair to be bleached, and kneading the bag to blend the liquid and powder into a paste while maintaining the opening in the bag closed to prevent dust from the powder escaping into the atmosphere outside the bag.

4,116,366

VACUUM BOTTLE CONTAINER WITH AIR PUMP HAVING VENT CLOSING SWITCH

Takefumi Takenakashima, Yao, and Toyohiko Takatuki, Izumi, Japan, assignors to Zojirushi Vacuum Bottle Co., Ltd., Osaka, Japan

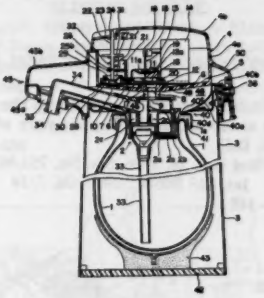
Filed May 19, 1977, Ser. No. 798,668

Claims priority, application Japan, Aug. 5, 1976, 51-93741

Int. Cl.[2] **B67D** *5/54;* **F04B** *43/04, 49/02, 49/10*

U.S. Cl. 222—131 **2 Claims**

1. A vacuum bottle container having an air pump adapted to feed air into the interior of the vacuum bottle to increase the internal pressure therein, whereby the liquid in the vacuum bottle is poured therefrom, said container comprising a cylindrical body member, a vacuum bottle disposed in said body member, a cylindrical hollow stopper adapted to close the mouth of the vacuum bottle, said stopper having a downwardly-extending pumping tube and a transversely-extending pouring tube communicating with said pumping tube, a hollow lid body pivotally mounted on the upper end of the body member, said lid body being provided at its bottom with an air outlet and a vapour outlet, a chamber formed in said lid body and communicating with the interior of the vacuum bottle through said air outlet and with the atmosphere through said vapour outlet, an air pump disposed in said lid body and connected to said chamber, a motor for operating said air pump, said motor being disposed in said lid body and electrically connected to a



battery housed in said lid body, a valve for closing said vapour outlet, said valve being operated by means for operating a switch connected in the motor driving electric circuit.

4,116,367

APPARATUS FOR SUPPLYING POWDER TO CONTINUOUS CASTING MOLD

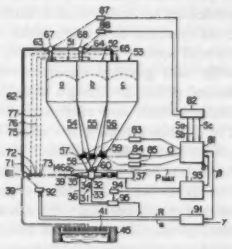
Tohri Katnoka, and Tetsuo Imi, both of Ohita, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Nov. 5, 1976, Ser. No. 739,450

Claims priority, application Japan, Nov. 12, 1975, 50-152894[U]; Nov. 20, 1975, 50-139615

Int. Cl.[2] **B22D** *45/00*

U.S. Cl. 222—144.5 **10 Claims**



1. An apparatus for supplying powder to a continuous casting mold comprising:

a plurality of powder hoppers arranged side by side, each having a funnel shaped bottom portion;

a plurality of dampers connected with the bottom end of the respective hoppers;

a header connected with said dampers;

a pneumatic powder conveyor connected to the bottom of said header for conveying powder to the mold, said conveyor having a powder intake which communicates with said dampers through said header, a powder forwarding portion connected with the powder intake section, and a means for directing pressurized air into said powder conveyor for entraining the powder in the air;

a powder supply nozzle means for positioning above the casting mold;

a main pneumatic powder conveying pipe having one end connected with said powder forwarding portion of said pneumatic powder conveyor and the other end connected with said nozzle means;

a pneumatic powder returning means connecting an intermediate point of said main pipe with the top portions of the respective hoppers; and

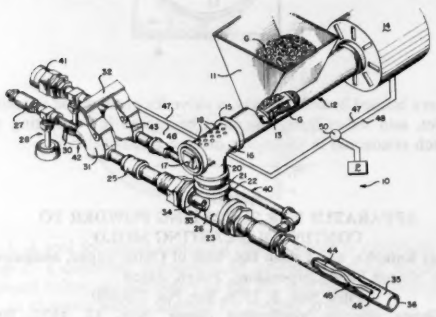
a changeover mechanism in the connection between said main pipe and said returning means for changing over the connection between the main pipe and the returning means for returning powder to the hoppers.

4,116,368

CLOG-FREE INORGANIC GROUT EMPLACEMENT GUN

Colen S. Smith, Spokane, Wash., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Dec. 16, 1976, Ser. No. 751,402
Int. Cl.[2] B05B *7/04, 7/06, 7/14*
U.S. Cl. 222—145 **5 Claims**



5. A method of dispensing media comprising the steps of guiding a moving gaseous medium in a conduit extending between a first point and a second point therein with the latter point being defined by an outlet orifice, directing solid material into said gaseous medium at a third point in said conduit between said first and second points whereby said solid material is admixed with said gaseous medium and moved thereby toward said second point, directing a liquid in a further conduit to move centrally within said extended conduit and substantially parallel to a longitudinal axis thereof between said third and second points and toward a fourth point in proximity to said outlet orifice terminating said further conduit at an opening disposed so as to face substantially parallel to a central portion of said outlet orifice, and wherefrom said liquid issues in a tight stream confined within said admixed solid material and gaseous medium whereby effective admixing of said gaseous medium and said solid material with said liquid is essentially precluded until movement thereof is outside said conduits beyond said outlet orifice.

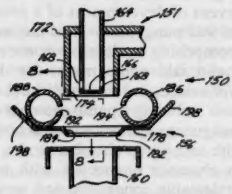
4,116,369

APPARATUS FOR MAKING FROZEN CONFECTIONS

John V. Crowder, Bethpage, N.Y., assignor to Consolidated Foods Corporation, Chicago, Ill.

Division of Ser. No. 102,411, Dec. 29, 1970, Pat. No. 3,971,853. This application Apr. 29, 1976, Ser. No. 681,316
Int. Cl.[2] B67D *5/60*
U.S. Cl. 222—145 **6 Claims**

1. An apparatus for substantially intermixing a plurality of ingredients which will form a frozen confection of the type where each of said ingredients will be substantially discernible comprising a nozzle to be positioned over a mold for a frozen confection, said nozzle including a substantially planar member defining an aperture and at least first and second conduits for receiving at least first and second ingredients, said first and second conduits being disposed in spaced overlying relation to said aperture, said first conduit being substantially coaxial with and disposed within said second conduit, said first conduit having at least a first discharge opening within said second conduit, said second conduit comprising an outer wall defining a second discharge opening, so that said first and second ingredients are discharged through said aperture, third conduit means for receiving at least a third ingredient, said third conduit means being supported by said substantially planar member adjacent said aperture, said third conduit means being in communication with said aperture to permit said third ingredient to be discharged from said third conduit means through said aperture so that all of said ingredients are discharged through said aperture, said planar member being elongated and being provided with a plurality of spaced apertures, said third conduit means being elongated and being disposed along said planar member, and said third conduit means being provided with an opening adjacent each of said apertures.

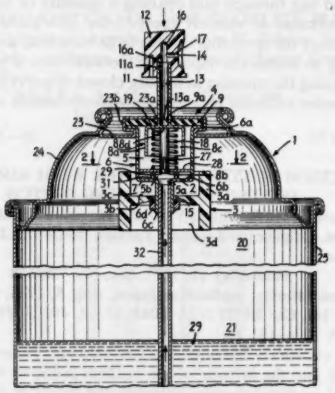


4,116,370

VAPOR TAP VALVE FOR AEROSOL CONTAINERS USED WITH FLAMMABLE PROPELLANTS

Joseph George Spitzer, 44 Coconut Row, Palm Beach, Fla. 33480; Marvin Small, 1100 Park Ave., New York, N.Y. 10021; Lloyd I. Osipow, 2 Fifth Ave., New York, N.Y. 10003, and Dorothea C. Marra, 107 Fernwood Rd., Summit, N.J. 07501

Continuation-in-part of Ser. No. 754,471, Dec. 27, 1976, which is a continuation-in-part of Ser. No. 706,857, Jul. 19, 1976, Continuation of Ser. No. 774,187, Mar. 3, 1977. This application Jun. 7, 1977, Ser. No. 804,423
Int. Cl.[2] B65D *83/14;* F16K *31/58*
U.S. Cl. 222—402.18 **25 Claims**



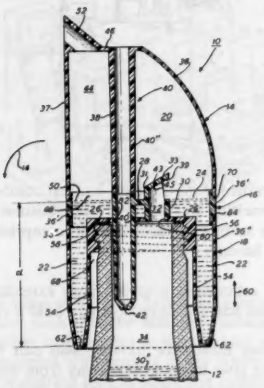
1. A vapor tap valve for use in aerosol containers with aerosol compositions containing liquefied flammable propellants, inhibiting delivery of flammable liquid propellant when the valve is opened immediately after shaking the container and contents, comprising, in combination, a delivery valve movable manually between open and closed positions and including a valve stem, a delivery port, and a valve chamber; bias means in the valve chamber biasing the delivery valve towards a closed position; a liquid tap orifice in flow communication with the valve chamber; a vapor tap orifice in flow communication with the valve chamber; an aperture forming a

passage to the valve chamber and putting the valve chamber in flow communication with at least one of (a) the vapor tap orifice and (b) both the vapor tap orifice and the liquid tap orifice; and a shut-off valve linked to and movable with the delivery valve, closing off the aperture and thereby closing off the flow communication from the vapor tap orifice to the valve chamber against entry of liquefied propellant therethrough into the valve chamber when the delivery valve is closed, and opening the aperture and thereby the flow communication from the vapor tap orifice to the valve chamber when the delivery valve is manually moved to the open position, against the biasing force of the bias means.

4,116,371
METERING DEVICE AND METHOD

Edward Johnson Towns, Convent Station, and Edward Morris Brown, Livingston, both of N.J., assignors to Neil Hugh Downing, Katonah, N.Y.

Filed Mar. 22, 1977, Ser. No. 780,106
Int. Cl.² G01F *11/26*
U.S. Cl. 222—455 **7 Claims**

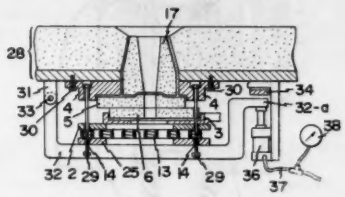


5. A fluid metering and pouring device comprising:
a first chamber,
a second smaller chamber below the first chamber when upright,
conduit means for supplying a fluid to said first chamber when the chambers are inverted,
a dump conduit between said chambers for dumping fluid from said first chamber to said second chamber when upright,
shield means disposed about said conduit means in said first chamber forming an opening in said conduit means and oriented to divert the flow of fluid in said first chamber around said conduit means opening while said chambers are being uprighted from the inverted position, said conduit means opening draining the fluid in excess of a given volume from said chambers after said chambers are uprighted to produce a measured volume in said second chamber,
means including a chamber dividing wall between the chambers having an edge above said second chamber when upright and spaced from one side wall of said first chamber, the space between said edge and said one side wall forming said dump conduit means, said opening being closer to said one side wall than said edge, and
a discharge opening coupled to said second chamber for discharging the fluid in said second chamber when said chambers are inverted, said discharge opening being located adjacent a side wall of said first chamber opposite said one side.

4,116,372
APPARATUS FOR APPLYING A DESIRED SEALING PRESSURE BETWEEN REFRACTORY PLATES OF SLIDING NOZZLE

Hiroshi Horiguchi, Ohmiya, and Terumoto Matsuo, Kitakyushu, both of Japan, assignors to Kurosaki Refractories Co., Ltd. and Nippon Steel Corporation, Tokyo, both of, Japan

Filed Nov. 19, 1976, Ser. No. 743,421
Claims priority, application Japan, Nov. 26, 1975, 50-141791
Int. Cl.² B22D *41/08*
U.S. Cl. 222—600 **15 Claims**



1. Apparatus for regulating the flow of molten metal from the discharge opening of a vessel containing molten metal, comprising:
a sliding nozzle positionable across the discharge opening of a vessel containing a molten metal, said sliding nozzle including an upper metal frame, means for mounting said upper metal frame in fixed relation to the molten metal containing vessel and in peripherally enclosing relation to the discharge opening thereof, a lower metal frame releasably connectable to said upper metal frame, stationary and sliding refractory plates positioned between said upper and lower metal plates, means for reciprocating said slidable plate relative to said stationary plate, spring means applying a desired sealing force to said plates to effect sealing between said plates as said slidable plate is reciprocated relative to said stationary plate, a pressure control device operable to apply a controlled pressure to said spring means so that the spring means applies said sealing force between said plates, connecting means for connecting said upper and lower metal frames after said pressure control device has applied said controlled pressure to said spring means such that said connecting means maintains said desired sealing force between said plates, and means for detachably mounting said pressure control device on the armature such that the pressure control device is detachable from the apparatus, whereby the pressure control device is not subjected to the temperature of the apparatus during operation thereof.

4,116,373
TWO POSITION SPARE WHEEL MOUNT FOR THE SIDEWALL OF A PICKUP TRUCK

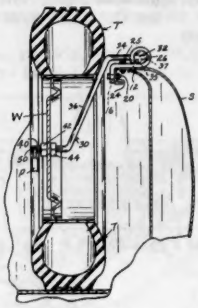
James R. Bryngelson, Grand Rapids, Minn.

Filed May 4, 1977, Ser. No. 793,529
Int. Cl.² B62D *43/00*
U.S. Cl. 224—42.21 **6 Claims**

1. A two position spare wheel mount for the sidewall of a pickup truck comprising:
(a) a base member having
(b) means for securing the same to the upper surface of the sidewall of a pickup truck,
(c) an elongated support member having a straight elongated base portion terminating at one end in
(d) an obliquely disposed elongated portion which terminates in
(e) a straight elongated outer end portion substantially parallel to said base portion,
(f) said base portion of said support member having a pin secured to the other end thereof and normal thereto,

(g) said base member having a hollow cylindrical member secured thereto and in which said pin is pivotally mounted,

(h) a slot formed in said hollow cylindrical member and through which said base portion of said support member extends to allow said support member to pivot on said pin substantially 180°,



(i) means rotatably mounting the end of said base portion of said support member in said pin so as to enable said support member to rotate about the longitudinal axis of said base portion,

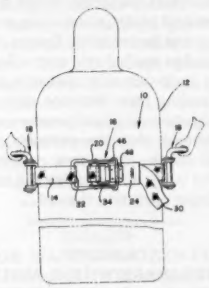
(j) said outer end portion having means thereon for securing a wheel thereto.

4,116,374

CYLINDER CARRYING STRAP

David J. Garello, Napa, Calif., assignor to Northwestern Equipment and Supply Co., Berkeley, Calif.

Filed Jul. 29, 1977, Ser. No. 820,311
Int. Cl.[2] B65D *71/00*
U.S. Cl. 224—55 **6 Claims**



1. A hand carrier for carrying an elongated article with a peripheral outer surface in a longitudinal orientation that is substantially vertical, comprising:

a. an elongated flat strap having a first end and a second end;

b. a buckle means fastened to said first end for releasably engaging and retaining said second end, said buckle means having means for tightening said strap around the peripheral surface of the article, wherein said strap and buckle means are adapted to encircle the article in a plane generally perpendicular to vertical during carrying;

c. a handle assembly including a substantially horizontally oriented hand grip member having a first end with a rigid friction plate member pivotally connected to said first end, and a second end spaced from said first end with a rigid friction plate member pivotally connected to said second end, said plate members having a friction surface adapted to pivot on a vertical axis and orient substantially flat against the peripheral surface of the article during carrying; and,

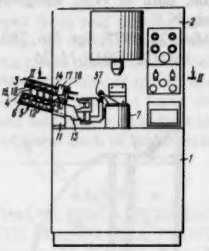
d. means for connecting said belt member to said handle assembly and forceably directing said friction surface against the peripheral surface of the article.

4,116,375

APPARATUS FOR HARD FACING OF VALVES FOR INTERNAL COMBUSTION ENGINES

Anatoly Alexandrovich Mozzhukhin, ulitsa Pochaininskaya, 23, kv. 43, and Vladimir Petrovich Sotchenko, ulitsa P.Tychiny, 13, kv. 210, both of Kiev, U.S.S.R.

Filed Apr. 26, 1977, Ser. No. 790,980
Int. Cl.[2] B23K *1/04, 37/04*
U.S. Cl. 228—48 **8 Claims**



1. An apparatus for hard facing internal combustion engine valves by the melting and fusion of heat-resistant rings of hard alloy upon the seating surfaces thereof, comprising:

an actuator having:

a body;

a pair of articulated gripping jaws extending from said body and adapted to receive and hold a valve having a stem;

jaw moving means for moving said pair of articulated gripping jaws towards and away from each other, said jaw moving means being mounted within said body;

a support for receiving an alloy ring, said support being hinged to said body; and

conveying means kinematically linking said support with said jaw moving means;

a manipulator carrying said actuator and adapted to turn the latter in horizontal and vertical planes for conveying the valve with the alloy ring thereon from a receiving area to a fusion or welding zone while the stem of the valve is upwardly directed;

a heating means for fusing the alloy ring, said means being arranged in the fusion or welding zone at the end of the horizontal travelling path of said actuator;

a means for controlling said jaw moving means both when said actuator is in the valve and alloy ring receiving area and in the fusion or welding zone.

4,116,376

METHOD OF MOUNTING INTEGRATED CIRCUIT CHIPS ON A SUBSTRATE AND APPARATUS FOR CARRYING OUT THE METHOD

Raymond Louis Delorme, Bagnolet, and Henri Grosjean, Le Plessis-Trevise, both of France, assignors to Compagnie International pour l'Informatique Cii-Honeywell Bull (Societe Anonyme), Paris, France

Filed May 31, 1977, Ser. No. 801,787
Claims priority, application France, Sep. 20, 1976, 76 28170
Int. Cl.[2] B23K *1/12;* H01L *21/60*
U.S. Cl. 228—170 **18 Claims**

1. A method of mounting on a substrate which is provided with at least one set of connecting areas arranged in a predeter-

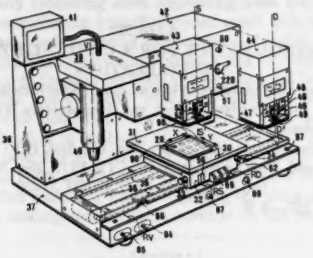
mined configuration about a center, at least one integrated circuit chip which has previously been mounted on a flexible support of inextensible insulating material, the said chip being provided with connecting conductors which are attached to the said flexible support and extend from the edges of the chip, comprising the steps of:

positioning the support containing the chip on a support carrier,

placing the support carrier in a cutting tool having a cutting head movable along a working axis and a cutting die arranged in the path of the said head, in such a way that the center of the chip is placed over the die and is aligned with said working axis,

placing the substrate on a support block movable in a direction perpendicular to the said working axis, initially positioning the support block such that a reference on said support block is aligned in predetermined positions with respect to a fixed positioning axis parallel to the said working axis,

shifting the substrate with respect to the support block to cause the center of a set of connecting areas on the substrate to coincide with the said fixed positioning axis,



moving the support block to bring the substrate under the cutting tool such that the reference means occupies the same position with respect to the working axis of the said tool as occupied with respect to the positioning axis,

actuating the cutting tool to cause the cutting head, in the course of its movement, to cut through the connecting conductors of the chip which has been positioned on the cutting die, carrying the chip thus separated from its support along by the head and positioning said separated chip against the substrate,

raising the head clear of the die and after the head has been so raised, moving the support block to bring the substrate under a soldering head movable along a working axis parallel to the positioning axis, in such a way that the reference means occupy the same position with respect to the working axis of the soldering head as occupied with respect to the positioning axis,

actuating the soldering head to press against the connecting areas on the substrate the portions of the connecting conductors, remaining on the chip which has been positioned against the substrate, supplying power to the head to cause the said portions to be soldered to the said areas, and returning the soldering head to its initial position.

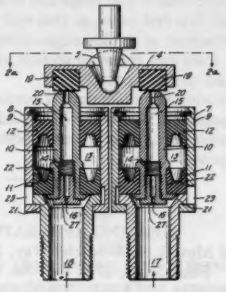
4,116,377

MIXER UNIT WITH THERMOSTAT-CONTROLLED VALVES

Maj Andersson, Stockholm, and Gunnar Lagher, Fjalkinge, both of Sweden, assignors to Maj Andersson Arkitektkontor AB, Stockholm, Sweden

Filed Feb. 11, 1977, Ser. No. 767,689
Claims priority, application Sweden, Feb. 16, 1976, 7601682
Int. Cl.[2] G05D *11/16*
U.S. Cl. 236—12 A **6 Claims**

1. A mixer unit with thermostat-controlled valves for mixing hot and cold liquid comprising a housing, valves for supplying hot and cold liquid to said housing, a yoke rockably mounted in the housing, the ends of which actuate the valves for hot and cold liquid respectively, said valves for hot and cold liquid comprising cylinders having outlet openings, pistons carried in



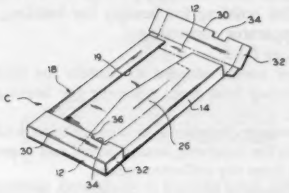
said cylinders and sealed by means of cup packings, the position of said pistons within said cylinders being movable to a suitable position for a certain mixture relationship between the liquids, by rocking movement of said yoke, and a bimetal spiral control thermostat for causing said rocking movement of said yoke upon regulation of said thermostat.

4,116,378

CARTON WITH RECLOSABLE INSPECTION FLAP

Richard L. Bell, Glenmorre; Patricia A. Josephs, Wayne, and Francis A. Chidsey, Jr., Devon, all of Pa., assignors to Container Corporation of America, Chicago, Ill.

Filed Oct. 25, 1977, Ser. No. 844,808
Int. Cl.[2] B65D *65/12*
U.S. Cl. 229—87 F **14 Claims**



1. In a carton, formed of a unitary blank of foldable paperboard, for holding and displaying a product such as bacon, the combination of:

(a) a bottom wall;

(b) opposed pairs of side and end walls foldably joined to and upstanding from opposed side and end edges of said bottom wall;

(c) a top wall including:

(i) a pair of end panels spaced from each other and foldably joined to and extending inboardly from upper edges of said end walls;

(ii) a pair of side panels spaced from each other and foldably joined to and extending inboardly from upper edges of said side walls and having portions overlying and secured with respect to portions of at least one of said end panels;

(d) said one end panel including:

(i) a generally U-shaped retaining section joined along an outboard edge to a related end wall;

(ii) a viewing section located intermediate the sides of said retaining section;

(e) said viewing section being partially detachably joined to said retaining section by:

(i) a hinge line extending across the entire width of said viewing section and disposed between a free inboard edge of said one end panel and the fold line joining said one end panel to said related end wall;

(ii) a pair of spaced lines of weakness extending from opposite ends of said hinge line to said free inboard edge of said first end panel, so that said viewing section may be detached, at its side edges along said lines of weakness, from said retaining section to permit viewing of a portion of said product;

(f) said viewing section including portions having interlocking engagement with portions of said side panels to retain said viewing section in a closed position after it has once been opened.

4,116,379

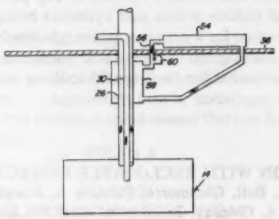
HEATING APPARATUS

Nyle Orland Movick, 4600 Macky Way, Boulder, Colo. 80302

Filed Jul. 1, 1977, Ser. No. 812,045

Int. Cl.[2] F24J *3/02*; F24D *3/00*

U.S. Cl. 237—1 A **10 Claims**



1. In a heating system for a building including fuel fired heating apparatus for heating a medium such as air or water and means for circulating the medium from a supply conduit to parts of the building for heating the building, supplemental heating apparatus comprising:

a working fluid;

collector means adapted to contain the working fluid for collecting heat from a source for heating the working fluid;

an expansion chamber in communication with the collector means for receiving heated liquid and vaporized working fluid from the collector means;

a first standpipe adapted to contain the working fluid with its upper end at an elevated location and its lower end at a lower location and in communication with the expansion chamber near its upper end;

a second standpipe adapted to contain the working fluid and in thermal conductive relationship with the first standpipe and in communication at one end with the collector means and at the opposite end with the first standpipe near the first standpipes lower end, whereby the working fluid may circulate in a closed circuit from the collector means into the expansion chamber down the first standpipe up the second standpipe and back through the collector means;

a heat storage tank located a level below at least a portion of the supply conduit of the heating system for containing a heat storage liquid for submerging at least one of the standpipes for extracting and storing heat from the heated working fluid;

a heat exchanger comprising a closed conduit loop routed through the storage liquid and the supply conduit and adapted to contain a heat transfer fluid and thermally circulate the heat transfer fluid from the heat storage liquid to the supply conduit for picking up heat from the heat storage liquid and for transferring the heat to the medium circulating in the heating system whereby heat may be extracted from the storage liquid whenever the temperature of the storage liquid is above the temperature of the medium circulating in the supply conduit,

a second heat exchanger comprising a second closed conduit loop for thermally circulating a second heat transfer fluid around the outside of the first or second standpipe; and

a heat radiator coupled to the second closed loop at a level above the lower end of the standpipes for radiating heat from the second heat transfer fluid to the building whereby the second heat transfer fluid may thermally circulate through the second closed loop picking up heat from the standpipes and transferring the heat through the radiator to the building.

4,116,380

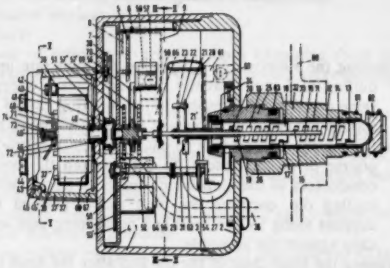
CONTROL DEVICE FOR A CENTRAL HEATING INSTALLATION

Dorotheus Donkervoort, Vlaardingen, Netherlands, assignor to Eerste Nederlandse Fabriek van Manometers BV, Schiedam, Netherlands

Continuation-in-part of Ser. No. 658,560, Feb. 17, 1976, abandoned. This application Jan. 17, 1977, Ser. No. 760,051

Int. Cl.[2] F24D *3/00*; G05D *23/00*

U.S. Cl. 237—8 R **8 Claims**



1. A control device for controlling the heating of a hot water boiler comprising:

a first temperature sensor for sensing the temperature of the boiler water,

control switch means,

means actuated by said first temperature sensor for switching said control switch means,

an outside temperature sensor including a liquid filled reservoir,

a tubular coiled spring,

means for communicating said tubular coiled spring and said reservoir,

said tubular coiled spring having the outer winding thereof movable,

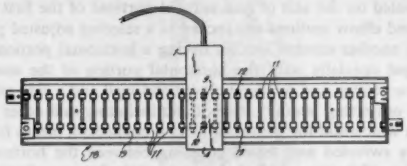
means responsive to movement of said outer winding for switching said control switch means whereby to vary the temperature at which said control switch means is switched under the control of the first temperature sensor in response to outside temperature,

said outer winding responsive means comprising means for connection to said outer winding at any one of a plurality of locations along said outer winding.

4,116,381
ELECTRICAL CONNECTION DEVICE FOR A TOY VEHICLE TRACK

Duncan Tong, Hong Kong, Hong Kong, assignor to Playart Ltd., Hong Kong, Hong Kong

Filed Dec. 16, 1976, Ser. No. 751,762
Claims priority, application United Kingdom, Jul. 30, 1976, 31929/76
Int. Cl.[2] A63H 19/30
U.S. Cl. 238—10 E 5 Claims

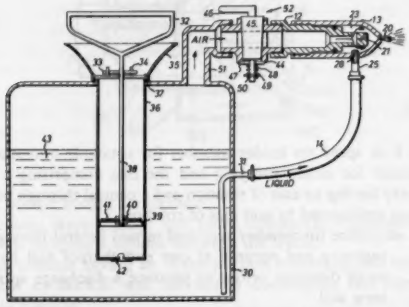


1. A toy railway track comprising in combination a continuous base section defined by a flat support plate and a pair of longitudinally extending sides depending from the plate, the base section including laterally spaced apart hole sets in the support plate, each set being defined by a plurality of spaced apart, longitudinally extending holes; a pair of solid rails disposed on top of the support plate and having a flat bottom face overlying the holes of the respective hole sets; an electric contact device detachably mounted to the base section and having a plurality of contacts, each aligned with a hole of the respective hole sets and resiliently urged upwardly to extend through the holes and contact each of said rails, the contact device further including means engaging the sides of the base section for holding the device in position on the base section.

4,116,382
SPRAY NOZZLE FOR ATOMIZING A LIQUID BY DIRECTING IT AGAINST AN OBSTRUCTION AND HAVING IT MIX WITH AIR

Ernest Joscelyn Clerk, 18 South Ave., Rest Pen, Kingston 10, Jamaica

Filed Jan. 11, 1977, Ser. No. 758,498
Claims priority, application United Kingdom, Jan. 26, 1976, 2820/76
Int. Cl.[2] B05B 7/24
U.S. Cl. 239—8 7 Claims

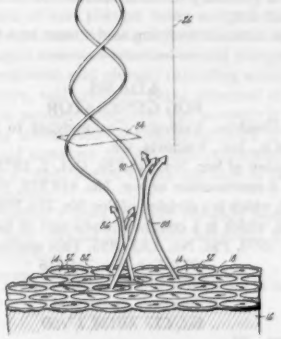


1. A method of producing a spray of liquid and air from a nozzle, comprising causing said liquid to be injected into a mixing chamber in the nozzle through a pinhole-like minute opening so as to form a high-pressure jet, directing said high-pressure jet toward an air supply pipe terminated in the mixing chamber to cause the liquid to disintegrate, causing a flow of pressurized air to flow from said air supply pipe into said mixing chamber to mix with and assist in the disintegration of the jet of liquid, passing the mixture of liquid and gas through an outlet orifice of the nozzle, the source of pressurized air and the source of liquid being in a common container in flow communication with said nozzles, the pressure of the air being used to pressurize the liquid and being adjusted so that the air passing into the nozzle is at a lower pressure than the liquid entering the nozzle.

4,116,383
METHOD AND APPARATUS FOR MIXING FLUID

Bruce Virgil Johnson, Manchester, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Feb. 10, 1977, Ser. No. 767,594
Int. Cl.[2] B05B 7/00
U.S. Cl. 239—8 15 Claims



7. An apparatus having flow passageways grouped into clusters located adjacent to each other in an assembly which is substantially perpendicular to the flow axis wherein the apparatus comprises:

a plurality of clusters each including;

a first passageway having a centerline axis which is not parallel to the flow axis; and

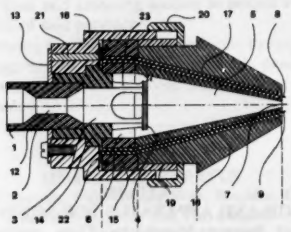
a second passageway adjacent to the first and having a centerline axis which is not parallel either to the flow axis or to the axis of the first passageay; and

means connecting the first and second passageways of each cluster to a first and second source of fluid wherein the flow of fluid through each passageway assumes a side component of fluid velocity which is perpendicular to the flow axis and the fluids exiting the assembly mix, the centerline axis of the passageways oriented to form a geometric array such that fluid exiting each first and second passageway in any one cluster interacts and causes the fluid to swirl in a rotating pattern about the flow axis, with the swirling fluid from adjacent clusters interacting and the direction of swirl created by each cluster being opposite in direction to the swirl of each cluster adjacent thereto.

4,116,384
ELECTROSTATIC POWDER COATING APPARATUS

Adrien Lacchia, 10 Impasse des Lecheres, 38240 Meylan, France

Division of Ser. No. 726,105, Sep. 24, 1976, which is a continuation-in-part of Ser. No. 640,924, Dec. 15, 1975, abandoned. This application May 31, 1977, Ser. No. 802,023
Claims priority, application France, Jan. 16, 1975, 75 02009
Int. Cl.[2] B05B 5/04
U.S. Cl. 239—15 3 Claims

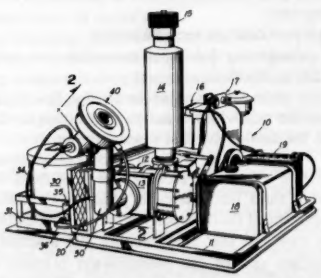


1. An electrostatic powder spraying nozzle including a slot type exit to effect a fan shape discharge comprising:
passage means for directing a stream of powder carrier gas mixture;
duct means downstream of said passage means; and
a flat plate deflector means disposed normal to said duct means, at an intermediate section thereof and so spaced from the duct defining walls of the duct means whereby to effect a generally uniform distribution of said mixture at the exit slot;
said duct means converting said stream to a flat fan shape.

4,116,385
FOG GENERATOR

David W. Waldron, Valdosta, Ga., assignor to Lowndes Engineering Co., Inc., Valdosta, Ga.

Continuation of Ser. No. 618,739, Oct. 2, 1975, abandoned, which is a continuation of Ser. No. 419,925, Nov. 29, 1973, abandoned, which is a division of Ser. No. 216,396, Jan. 10, 1972, abandoned, which is a continuation-in-part of Ser. No. 20,364, Mar. 17, 1970, Pat. No. 3,633,855. This application Mar. 4, 1977, Ser. No. 774,616
The portion of the term of this patent subsequent to Jul. 8, 1992, has been disclaimed.
Int. Cl.[2] A01M 17/00
U.S. Cl. 239—77 4 Claims

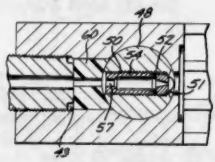


1. In a fog generator, an air blower means, a universal conduit having one end connected to said air blower means in communication therewith, and a fog generator head connected with the other end of said universal conduit for discharging fog in a selected direction, said universal conduit including a first elbow section including horizontal and vertical conduit portions, the horizontal conduit portion having said one end connected with said air blower means, an annular collar carried by said vertical portion of the first elbow section and having an internal annular shoulder, a second elbow section including vertical and horizontal portions, the vertical portion of the second elbow section having a reduced sleeve extension which has swiveled engagement within said collar, a ring seal interposed between said annular shoulder and the opposing end of said sleeve extension, a locking set screw for said sleeve extension on said collar, whereby the second elbow section may be swiveled on the axis of said vertical portions of the first and second elbow sections and locked in a selected adjusted position, another conduit section having a horizontal portion arranged coaxially with the horizontal portion of the second elbow section and having a closed end wall and a side extension projecting laterally thereof and including said other end with which said fog generator head is connected, means forming a swiveled and sealed coupling between the horizontal portion of the second elbow section and the horizontal portion of said another conduit section, the second elbow section having an end wall on the horizontal portion thereof in spaced opposed relationship to said closed end wall and being provided with a threaded opening, and a threaded tension rod extending axially through the horizontal portions of the second elbow section and said another conduit section and having threaded engagement with said threaded opening and swiveled engagement with said closed end wall, said threaded tension rod including a turning handle means exteriorly of said another conduit section, whereby said another conduit section is angularly adjustable with said fog generator head relative to said second elbow section and lockable in any selected adjusted position.

4,116,386
SPRAY NOZZLE HEAD

Oliver J. Calder, Orange, Calif., assignor to A.S.M. Company, Orange, Calif.

Continuation-in-part of Ser. No. 660,104, Feb. 23, 1976, abandoned. This application Feb. 14, 1977, Ser. No. 768,334
Int. Cl.[2] B05B 15/02
U.S. Cl. 239—119 15 Claims



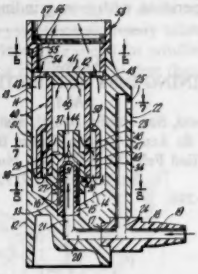
1. A spray tip holder member for rotatable mounting in a nozzle for airless spraying and the like comprising a turret body having an axis of rotation and a central through passageway orthogonal to said axis of rotation;
an orifice tip member received in said central through passageway and secured at one end thereof and having a small diameter orifice to produce a discharge spray pattern; and
a second orifice member also received in said central through passageway and secured therein to position a second orifice at the opposite end of the said central through passageway with said central through passageway open between said orifice tip and second orifice members to provide an unimpeded path for liquid therebetween, said second orifice having a diameter effective to diffuse liquid discharged therefrom, preventing its discharge as a coherent stream.

4,116,387

MIST GENERATOR

Carl P. Kremer, Jr., Darien, and Mark O. Powers, Norwalk, both of Conn., assignors to Eastfield Corporation, Darien, Conn.

Filed May 11, 1976, Ser. No. 685,307
Int. Cl.[2] A61M *11/02*
U.S. Cl. 239—338 19 Claims



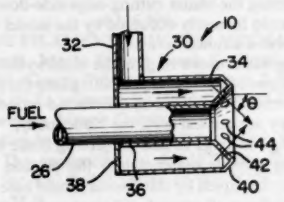
18. A mist generator comprising means for producing a mist, means defining a closed chamber, the first said means extending into said chamber for discharging said mist at a point within said chamber, said chamber defining means having a plurality of openings disposed rearwardly of the point of discharge of said mist into said chamber, a housing surrounding said chamber and having an outlet for discharging said mist and means for feeding a jet of gas into said housing to impart circular motion to said mist and cause the larger particles through the centrifugal force imparted thereto to strike said housing.

4,116,388

BURNER NOZZLE

Norman Kenneth Trozzi, W. Caldwell, N.J., assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Feb. 10, 1977, Ser. No. 767,242
Int. Cl.[2] B05B *7/10*
U.S. Cl. 239—406 10 Claims



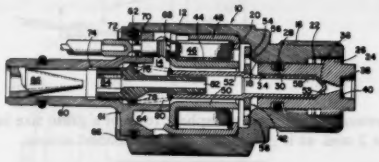
1. A burner nozzle comprising:
a housing having inner and outer concentric, cylindrical walls defining a volume between the walls;
a fuel conduit having an outlet portion extending into said inner cylindrical wall for axially discharging fuel from said housing;
an annular member joining one end portion of said inner and said outer cylindrical walls and forming a closure wall for said volume between said walls, said member having an aperture through which said fuel conduit passes;
means for supplying an atomizing fluid to the volume between said cylindrical walls; and
means for discharging said atomizing fluid in a direction substantially tangential to the fuel discharging axially from said fuel conduit, said fluid imparting a swirl to the fuel to distribute the fuel in a controlled manner to provide for even burning of the fuel.

4,116,389

ELECTROMAGNETIC FUEL INJECTION VALVE

Reginald D. Furtah, Livonia, and Gilbert J. Gardocki, Dearborn Heights, both of Mich., assignors to Essex Group, Inc., Fort Wayne, Ind.

Filed Dec. 27, 1976, Ser. No. 754,646
Int. Cl.[2] B05B *1/30*
U.S. Cl. 239—585 1 Claim



1. An electromagnetic fuel injection valve, comprising:
a non-magnetic tubular housing having an inlet and an outlet at opposite ends of said housing;
an electromagnetic actuator including an electromagnetic coil situated axially inside said housing and an electromagnetic frame associated therewith;
an adjustable valve seat mounted in said housing at said outlet;
a hollow, unitary, tubular, non-magnetic plunger situated for axial movement within the bore of said electromagnetic coil, the end of said plunger being adapted to cooperate with said valve seat to control flow therethrough;
a washer shaped armature attached to said plunger intermediate its ends with said plunger extending axially through said armature, said armature being attracted to said electromagnetic actuator whenever said actuator is energized, there being substantially no magnetic force of attraction between said armature and said electromagnetic actuator other than at right angles to the flat face of said washer shaped armature;
means for causing a fluid flowing between said inlet and outlet to flow around said electromagnetic actuator to cool said coil; and
adjustable means for biasing said plunger toward said valve seat.

4,116,390

PROCESS FOR REDUCING THE GRAIN SIZE OF PHOSPHATE ROCK

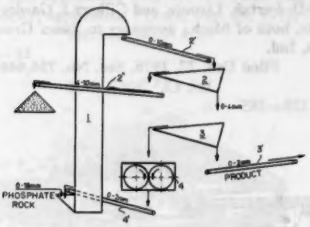
Wilhelm Wengeler, Bochum-Stiepel, and Egbert Hoffmann, Bochum, both of Germany, assignors to Uhde GmbH, Dortmund, Germany

Continuation of Ser. No. 655,959, Feb. 6, 1976, abandoned. This application Apr. 4, 1977, Ser. No. 784,509
Claims priority, application Fed. Rep. of Germany, Feb. 14, 1975, 2506316
Int. Cl.[2] B02C *23/14*
U.S. Cl. 241—24 1 Claim

1. The process for transforming freshly mined phosphate rock having a moisture content of about 10–14% into crushed phosphate rock having a grain size under 2 mm. for further treatment in the production of phosphoric acid comprising the steps of:
(a) screening the freshly mined rock with a first screen to eliminate a first fraction consisting essentially of grain sizes greater than 4 mm.,
(b) disposing of the first fraction,
(c) screening that rock which passes through the first screen with a second screen to isolate a second fraction consisting essentially of grain sizes between 4 mm. and 2 mm.,

(d) grinding the second fraction in a plain-roller mill to a grain size inferior to 2 mm.,

(e) combining the second fraction after grinding with freshly mined rock being subjected to the first screen, and



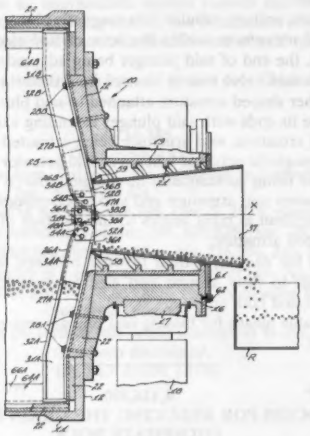
(f) removing crushed phosphate rock of a grain size inferior to 2 mm. as it passes through the second screen.

4,116,391

BALL DISCHARGER FOR GRINDING MILL

Raymond C. Jenness, Milwaukee, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Jun. 6, 1977, Ser. No. 804,053
Int. Cl.² B02C *17/18*
U.S. Cl. 241—171 **3 Claims**



1. A grinding media discharger for a rotary grinding mill having a hollow shell body provided with a discharge end wall including an outlet into a hollow trunnion and a feed end, said hollow shell body having an axis coaxial with the axis about which the mill rotates;

a grinding media pick-up means comprising a fabricated trough structure which is removably secured to the interior surface of the discharge end wall of the mill and extending radially from the discharge end wall outlet to the shell and being in communication with the outlet, said fabricated trough including a bottom plate, a pair of side plates and a top plate welded together, one of said side plates being on the side of the trough facing in the direction in which the mill rotates terminating a predetermined distance from the mill shell to define a scoop opening facing in the direction of rotation of the mill; and,

a hollow conical funnel removably disposed within the hollow trunnion and arranged to be in communication with the discharge end wall outlet and to extend beyond the exterior end of the trunnion to receive the grinding media from said trough and to direct the grinding media through the hollow trunnion to the exterior thereof;

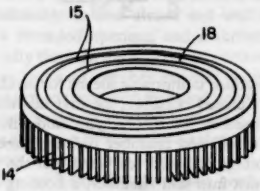
whereby the grinding media picked-up by said scoop will flow radially along said trough inwardly towards the mill center as the mill rotates and discharges into the funnel through the discharge end wall outlet to the exterior of the trunnion and said grinding media pick-up means being removed from within the shell after the grinding media has been removed from the mill to condition the mill for further operation with new grinding media.

4,116,392

PULP REFINING DISK AND METHOD OF MAKING SAME

Waldemar Zinezi, Sao Paulo, Brazil, assignor to Inox Industria E Comercio de Aco S/A, Sao Paulo, Brazil

Filed Feb. 22, 1977, Ser. No. 770,273
Int. Cl.² B02C *7/12*
U.S. Cl. 241—296 **3 Claims**



1. The method of making a pulp refining disk comprising the steps of

A. fabricating a model which reproduces the intended disk, said model having a discoid base and a circular array of generally parallel vanes projecting from one side of the base representing the locations of the knife blades in the intended disk, said model being made of easily workable material,

B. employing said model to form a negative image mold of the model,

C. fabricating a plurality of tempered knife blades having approximately the same length and thickness as the model vanes but having a height in excess of said vanes,

D. positioning the blades cutting-edge-side-down in the slots in the mold formerly occupied by the model vanes so that they form a circular array,

E. placing one or more rings in the mold so that they rest on the margins of the blades projecting into the portion of the mold formerly occupied by the discoid model base, and so that they are coaxial with the blade array,

F. securing the rings to said projecting blade margins, and

G. casting settable material into the portion of the mold formerly occupied by the discoid model base whereby the material flows all around said rings and around both sides of the margins of the blades projecting into that portion so that when the material sets the finished article comprises a solid disk having a circular array of knife blades imbedded in and projecting from one side of the disk.

4,116,393

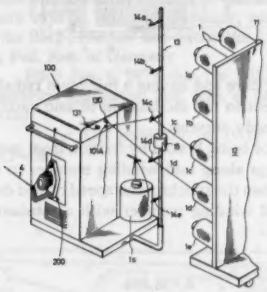
APPARATUS FOR COLLECTING AND PREPARING SAMPLE YARNS TO BE TESTED

Yoshinori Inouye; Hiromitsu Kanamori; Nobuo Tsuchida; Syozo Morishita, and Tetsuhiko Endo, all of Ohtsu, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Oct. 11, 1977, Ser. No. 841,052
Claims priority, application Japan, Oct. 9, 1976, 51/121443
Int. Cl.² B65H *54/00*; G01L *5/04*
U.S. Cl. 242—1 **24 Claims**

1. An apparatus for preparing a continuous test yarn com-

posed of end-to-end connected sample yarns having a certain length, comprising (1) sample yarn collecting means which collects sample yarns having a certain length from a plurality of yarn packages and connects each of them to one another in an end-to-end manner to form a continuous yarn, (2) means for storing and feeding said continuous yarn, said storing and feeding means including a storing drum on which the continuous yarn is stored by introducing the continuous yarn from the peripheral direction of said drum and winding a predetermined quantity of the continuous yarn on the drum and from which the stored continuous yarn is continuously taken out from the axial direction of the drum, the speed for winding the continuous yarn on the storing drum being higher than the speed for



taking out the continuous yarn from said storing drum, and (3) a preset counter for indicating and counting a predetermined length of the continuous yarn stored in said storing and feeding means by one storing operation, wherein said preset counter transmits a signal when said storing and feeding means completes storing of the predetermined length of the continuous yarn, to instruct said storing and feeding means to stop the yarn storing operation and to instruct said sample yarn collecting means to prepare for the yarn connecting operation, and wherein said sample yarn collecting means transmits a signal on completion of the sample yarn collecting and connecting operation to cause said storing and feeding means to initiate the yarn storing operation.

4,116,394

MOVING FILAMENT GRIPPING MECHANISM

Robert E. Smith, Monte Sereno; Frank S. Chytil, Escondido, both of Calif.; George Feldstein, and Dorman J. Swartz, both of Madison, N.J., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 703,715, Jul. 9, 1976, abandoned. This application Jul. 14, 1977, Ser. No. 815,732

Int. Cl.[2] B65H *54/00, 65/00, 75/28*

U.S. Cl. 242—25 R **6 Claims**

1. Apparatus for gripping and retaining an advancing filament on a rotating storage reel comprising, in combination:

(a) a reel having a core;

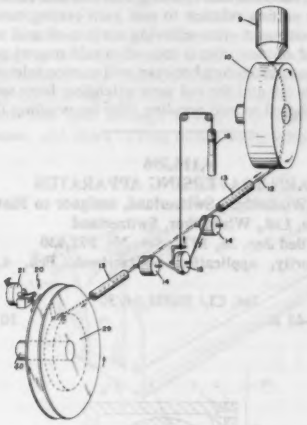
(b) a rotable reel mounting assembly for receiving said reel;

(c) a pivotable filament gripping element associated with said reel mounting assembly having a gripping leg adapted to hold the filament, when the gripping element is in a closed position, against the core of said reel in gripping engagement, and adapted further to be locked in an open position with the leg away from said reel core;

(d) biasing means adapted to pivot said filament gripping element into closed position to bring the gripping leg into gripping engagement with the filament and the core of said reel;

(e) retaining means adapted to releasably hold said gripping element in open position; and

(f) triggering means adapted to release said retaining means to permit said biasing means to pivot said filament gripping element into closed position to bring the gripping leg



into gripping engagement with the filament and the core of said reel.

4,116,395

DOFFING DEVICE FOR SPINNING MACHINES

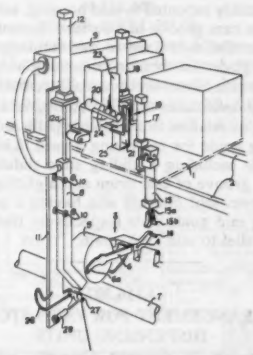
Guy Courvoisier, Geneva, Switzerland, assignor to Nuova San Giorgio S.p.A., Genova-Sestri, Italy

Filed Dec. 27, 1976, Ser. No. 754,606

Claims priority, application Switzerland, Jan. 8, 1976, 155/76

Int. Cl.[2] B65H *54/26*

U.S. Cl. 242—35.5 A **3 Claims**



1. A bobbin doffing device for substituting a winding tube for a bobbin mounted on support means and rotated by a drive means for receiving yarn from a spinning unit, said doffing device comprising a suction conduit having a suction inlet, means for moving the suction inlet of said conduit from a first position adjacent a yarn length stretched between said spinning unit and said bobbin to allow said conduit to suck the yarn produced by said spinning unit, and a second position spaced from said first position for holding the yarn stretched between said spinning unit and said suction inlet, means for removing said bobbin from said drive means whereby the yarn is picked up by said suction inlet when moved to said first position, yarn cutting means for cutting the yarn extending from said suction inlet to said bobbin when said suction inlet is in said first position, means for removing said bobbin from said support means, means for mounting said winding tube on said support means,

said winding tube having a yarn adhering surface, and a yarn pusher operatively related to said yarn cutting means to move yarn stretched between said spinning unit and said suction inlet into operative cutting relation to said yarn cutting means and into contact with said yarn adhering surface of said winding tube when said suction inlet is moved to said second position, whereby the yarn extending between said suction inlet and said spinning unit is cut and the cut yarn extending from said spinning unit is adhered to said winding tube for winding thereon.

4,116,396

YARN TRAVERSING APPARATUS

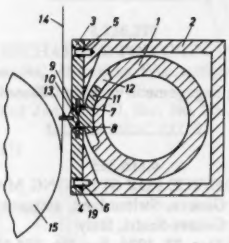
Jakob Fluck, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Jan. 26, 1978, Ser. No. 872,430

Claims priority, application Switzerland, Feb. 4, 1977, 1353/77

Int. Cl.[2] B65H *54/30*

U.S. Cl. 242—43 R **10 Claims**



1. An apparatus for traversing a yarn across a given path on a winding machine; said apparatus comprising

a housing

a drum rotatably mounted in said housing, said drum having an endless cam groove in a surface thereof;

a pair of parallel rails fixed to said housing, each said rail having a guide slat thereon containing a rigid center section and a pair of end sections, each said end section being elastically deflectable to a limited degree in a direction at right angles relative to said given path; and

a traversing guide for traversing a yarn in said given path, said guide including a gliding shoe slidably disposed in said cam groove of said drum and a gliding member projecting from said housing and having a pair of grooves receiving said guide slats respectively therein for movement parallel to said given path.

4,116,397

DRIVE ARRANGEMENT FOR YARN STORAGE AND DISPENSING UNITS

Martin Burgbacher, St. Georgen, Germany, assignor to Papst Motoren KG, St. Georgen, Schwarzwald, Germany

Continuation of Ser. No. 530,039, Dec. 5, 1974, abandoned. This application Aug. 20, 1976, Ser. No. 716,471

Claims priority, application Fed. Rep. of Germany, Dec. 6, 1973, 2360900

Int. Cl.[2] B65H *51/20*

U.S. Cl. 242—47.01 **5 Claims**

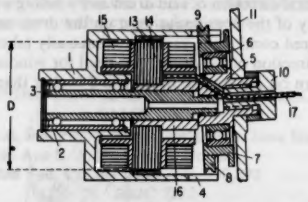
1. A drive arrangement for a yarn storage and dispensing unit of the type having a cylindrical winding member rotatably mounted to take up yarn at a yarn supply point and axially shift the yarn in juxtaposed windings along said winding member to a yarn delivery point from which the yarn can be fed to a textile machine, said drive arrangement comprising

a synchronous hysteresis drive motor including

stator means centrally disposed within said winding member on a fixed shaft and including a laminated core and a motor coil;

external rotor means rotatably mounted on said shaft including said winding member, said winding member being thin-walled and constructed of a light, nonmagnetic metal; and

a hysteresis ring constructed of magnetically low-grade carbon steel carried by said winding member in axial alignment with said stator core, said hysteresis ring having an axial length no greater than the axial length of



said stator core and having a minimum radial thickness with respect to full modulation of said carbon steel to suppress eddy currents,

said drive motor being braked by friction from movement of yarn windings along said winding member to operate at speeds less than the synchronous speed of said drive motor to drive said winding member with a substantially constant torque.

4,116,398

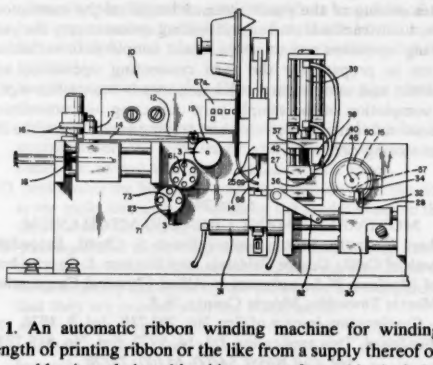
AUTOMATIC RIBBON WINDING MACHINE

Bruce D. Roberts, Dayton, Ohio, assignor to Central States Tooling Service, Inc., Dayton, Ohio

Filed Apr. 7, 1977, Ser. No. 785,335

Int. Cl.[2] B65H *19/26, 19/28, 25/32*

U.S. Cl. 242—56 R **11 Claims**



1. An automatic ribbon winding machine for winding a length of printing ribbon or the like from a supply thereof onto a spool having a hub and hooking means formed in the hub for securing the ribbon on the hub through a hole in the ribbon near the leading edge of the length of ribbon, comprising:

a. means for supporting such a spool on the machine and for rotating the spool in a winding direction,

b. means for punching a hole in the ribbon at a predetermined location in spaced relation to the leading edge thereof,

c. pin means for gripping the ribbon at a location near the leading edge of the ribbon by penetration of the ribbon from one side thereof for applying tension to and moving the ribbon with said gripping means when said gripping means is moved in a first, ribbon advancing direction and for releasing the ribbon therefrom when the ribbon is moved faster relative thereto in the same direction,

d. means for moving said gripping means in said first direction to bring the leading edge of the ribbon and the portion thereof having said hole therein to positions adjacent

the hub of an empty spool on said spool supporting and rotating means, and

e. means causing the portion of the ribbon having said hole therein to be partially wrapped about the hub of an empty spool supported on said spool supporting and rotating means while the hub is rotated so that rotation of the spool provides for engagement of the spool hooking means with said hole for pulling the ribbon in said first direction, releasing the ribbon from said gripping means, and winding the length of ribbon from the supply thereof onto the spool.

4,116,399

DEVICE FOR AUTOMATICALLY DETECTING THE END OF A WEB AND SPLICING A NEW WEB THERETO

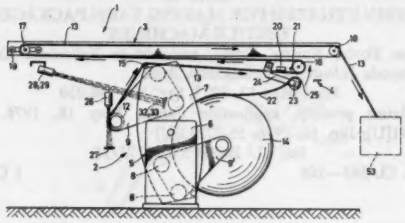
Hans Mosburger, Weiherhammer, and Christoph Reis, Etzenricht, both of Fed. Rep. of Germany, assignors to BHS-Bayerische Berg-, Hütten- und Salzwerke Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jun. 6, 1977, Ser. No. 803,673

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1976, 2627103

Int. Cl.[2] B65H *19/16, 19/08*

U.S. Cl. 242—58.4 **9 Claims**



1. A device for automatically detecting the end of or a tear in a web of material having a pair of longitudinal edges travelling through a corrugated cardboard installation or the like and for splicing said end or tear with a new web, the installation including a feed roller for a feed web roll and a prepared new web roll, said device comprising, control means movable into a preparatory stage for automatic activation of said web splicing, web sensing means including at least one sensor positioned at each of said longitudinal edges of said web, a web brake to slow the speed of the web through the installation, and a web storage space from which a supply of web material is removed during the web splicing, whereby when the end of the web is reached or when a tear therein occurs said sensors detect the same and deliver a signal to the control means to effect splicing of a new web.

4,116,400

MOTORIZED FILM TAKE-UP CANISTER

Lamar J. Jones, Tate, and Carl W. Williams, Woodstock, both of Ga., assignors to Lockheed Corporation, Burbank, Calif.

Filed May 27, 1977, Ser. No. 801,222

Int. Cl.[2] B65H *17/02;* **G03B** *17/26*

U.S. Cl. 242—67.1 R **2 Claims**

1. A drive for applying a continuous take-up tension on an elongate web extending into a take-up canister comprising in combination:

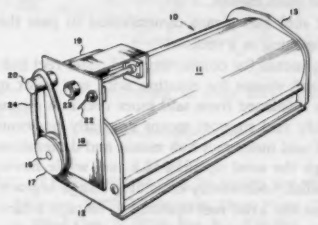
a chamber forming canister having a web entrance thereto, a pair of opposite end walls, and a rotatable shaft mounted in the end walls and extending through the chamber;

means incorporated with said shaft for connecting the web entering the canister entrance to the shaft;

a shaft rotary drive pulley means mounted to one end of said shaft external of said chamber;

an electric motor mounted proximate the container end wall said shaft rotary drive pulley means is near, said motor driving a motor rotary spindle drive means external of said chamber and spaced from said shaft rotary drive means;

and a continuous rotary drive O-ring means frictionally engaging both said shaft rotary drive pulley means and said motor rotary spindle drive means whereby rotation of said motor rotary spindle drive means by said motor can rotate said shaft through its said shaft rotary pulley drive means, said drive O-ring means sized whereby said frictional engagement of said drive O-ring means with the motor rotary spindle drive means is sufficiently small whereby said motor rotary spindle drive means may continue to rotate without rotating either the shaft or the drive O-ring means when the web is in sufficient tension to prevent web take-up onto the shaft as well as to permit said motor rotary spindle drive means to continue rotation as a portion of the web is withdrawn from the canister chamber and said shaft rotary pulley drive means is rotated in the direction opposite to that of the web take-up direction.



4,116,401

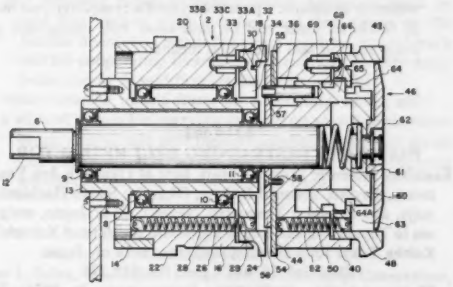
DUAL REEL HUB

Donald A. Evert, Littleton, Colo., and Charles W. Nies, deceased, late of Littleton, Colo. (by Carolyn J. Nies, executrix), assignors to Honeywell Inc., Minneapolis, Minn.

Filed May 13, 1977, Ser. No. 796,528

Int. Cl.[2] G03B *1/04;* **B65H** *17/02*

U.S. Cl. 242—68.3 **12 Claims**



1. A dual reel hub for mounting an inner reel and an outer reel coaxially with each reel having an axial opening with at least one longitudinal groove on an inner surface thereof comprising

an inner reel hub means dimensioned to pass through the axial opening in a reel and having a fixed outwardly extending circumferential flange means at one end thereof to engage a face of a reel,

a first rotatable locking ring means coaxially positioned on the other end of said reel hub means for said flange means

and dimensioned to pass through the axial opening in a reel while having at least one radially outwardly extending locking finger projecting past the axial opening in a reel to engage a face of a reel and dimensioned to pass through the longitudinal groove in the axial opening of a reel,

first spring means connecting said locking ring means to said reel hub means and urging said locking ring means toward said fixed flange means,

center shaft means,

bearing means rotatably mounting said inner reel hub means on said shaft means,

an outer reel hub means dimensioned to pass through the axial opening in a reel,

attaching means for connecting said outer reel hub means to said shaft means for rotation with said shaft means and axially displaced from said inner reel hub means,

a rotatably reel support means coaxially positioned at one end of said outer reel hub means and dimensioned to pass through the axial opening in a reel while having at least one radially outwardly extending flange segment projecting past the axial reel opening to engage a face of a reel and dimensioned to pass through the longitudinal groove in the axial opening in a reel,

a second rotatable locking ring means coaxially positioned on the other end of said outer reel hub means for said reel support means and dimensioned to pass through the axial opening in a reel while having at least one radially outwardly extending reel locking finger projecting past the axial reel opening to engage a face of a reel and dimensioned to pass through the longitudinal groove in the axial opening in a reel,

second spring means connecting said second locking ring means to said outer reel hub means and urging said second locking ring means toward said reel support means, and

actuating means for selectively interconnecting said second locking ring means, said outer reel hub means, said reel support, means and said first locking ring means for aligning said locking fingers on said first and second locking rings with said flange segment on said reel support whereby the longitudinal groove in the axial opening of a reel passes over said aligned locking fingers and said flange segment to permit a mounting and dismounting of reels on said inner and outer reel hub means and for misaligning said locking fingers and said flange segment whereby to assume a position against a respective reel face to retain an inner reel on said inner hub means and an outer reel on said outer hub means.

4,116,402

PASSENGER RESTRAINING BELT RETRACTOR

Kenichiro Nomura; Mamoru Mori, both of Okazaki; Jun Yasumatsu, Toyota; Tatsushi Kubota, Okazaki; Sadao Hachisuka, Anjo, and Kazuhisa Tatematsu, Nagoya, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha and Kabushiki Kaisha Tokai Rika Denki Seisakusho, both of, Japan

Filed Jul. 25, 1977, Ser. No. 818,296

Claims priority, application Japan, Aug. 3, 1976, 51-104293[U]

Int. Cl.[2] A62B *35/02;* B65H *75/48*

U.S. Cl. 242—107.1 **10 Claims**

1. A passenger restraining belt retractor for winding up two restraining belts, on a single retractor shaft one over the other comprising:

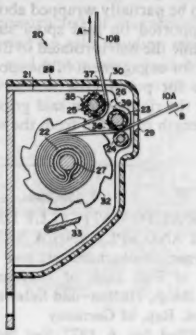
a base;

a retractor shaft rotatably supported by said base;

two restraining belts wound up on said retractor shaft one over the other;

a guide adjacent one of said belts;

a first roller, said roller engaging with and pressing against said guide one of said belts; and



a transmission means for causing said roller to rotate as the other one of said two belts is extended thereby insuring that both belts are extended equally.

4,116,403

BOBBIN UTILIZED FOR MAKING YARN PACKAGES IN TEXTILE MACHINES

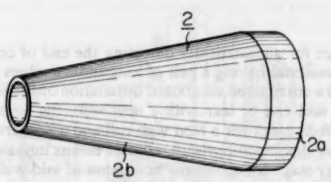
Teruo Ikeda, Kariya, Japan, assignor to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Japan

Filed May 11, 1977, Ser. No. 796,030

Claims priority, application Japan, May 18, 1976, 51-62981[U]; Jun. 14, 1976, 51-77283[U]

Int. Cl.[2] B65H *55/00, 75/10*

U.S. Cl. 242—165 **1 Claim**



1. A yarn package comprising a bobbin having a major frustoconical portion and a minor smooth cylindrical portion extending from and coextensive with the large diameter end of said frustoconical portion, a conical yarn cheese wound only on said frustoconical portion of said bobbin, and a reserve yarn winding extending from the large diameter end of said cheese and wound only on said smooth cylindrical portion of said bobbin, whereby said reserve winding may be readily removed from said bobbin without substantially increasing the tension thereof.

4,116,404

AUTOMATIC BALANCING CONCEPT

Thomas H. Howell, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

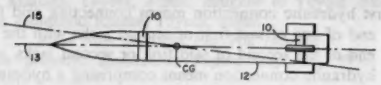
Filed Jul. 22, 1977, Ser. No. 818,188

Int. Cl.[2] F42B *15/02*

U.S. Cl. 244—3.23 **3 Claims**

1. An automatic system for balancing a rocket during flight said system comprising: two annular containers installed forward and aft of the rocket longitudinal CG station; said containers being provided with a chamber partially filled with high density fluid; a cover for closing said chamber and a

plurality of paddles fastened to the underside of said cover and extending into said chamber to angularly accelerate and move



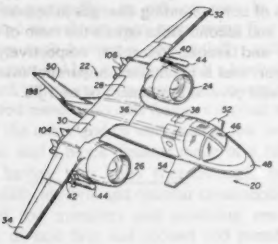
the fluid to the outer wall of said chamber thereby aligning the CG of each container about the rocket spin axis.

4,116,405

AIRPLANE

Anthony C. Bacchi, Massapequa, and Robert W. Kress, Lloyd Harbor, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Mar. 28, 1977, Ser. No. 781,691
Int. Cl.² B64C *15/12*
U.S. Cl. 244—12.4 **11 Claims**



8. An airplane comprising:
a fuselage;
a wing for said fuselage, said wing being of a gull-wing contour having a center section projecting normal to the fuselage joined on each side to swept forward-tips, said wing being mounted in a wing well at the top of said fuselage;
propulsion means mounted under said wing so as to underlie said wing at the high point of the gull-wing contour to be within the fuselage profile;
stabilizer fins for said fuselage, said stabilizer fins being pivotally supported from the bottom of and to each side of said fuselage ahead of and under said propulsion means; and
vertical fin means haivng a rudder at the tail of said fuselage.

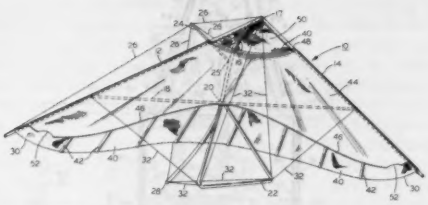
4,116,406

HANG GLIDER HAVING INFLATABLE AIRFOIL

Paul D. Hamilton, Apt. 11E River Run Apts., New Hartford, Conn. 06057

Filed Jun. 17, 1977, Ser. No. 807,412
Int. Cl.² B64C *31/02*
U.S. Cl. 244—16 **15 Claims**

1. A hang glider having a wing comprising, in combination:
A. a rigid frame including
(1) a pair of leading edge members, adjacent ends of said members interconnected at a location corresponding to the nose of the wing and serving to define the leading edges of the wing, and
(2) a keel interconnected at its leading end to said leading edge members at the nose of the wing and extending rearwardly to the trailing edge of the wing;
B. a sail affixed to said frame, said sail including top and bottom fabric sheets joined along the leading edges of the wing and along a seam adjacent to and coextensive with the trailing edge of the wing to define an envelope;
C. means located at the nose of the wing forming an intake opening in said envelope through which an airstream enters to inflate said envelope and thereby create a double



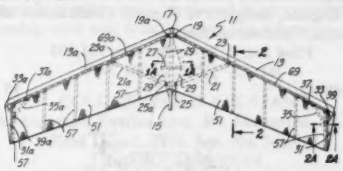
surface airfoil constituting at least fifty percent of the wing area.

4,116,407

HANG GLIDER WITH COLLAPSIBLE AIRFOIL

Stephen C. Murray, 33871 El Encanto, Dana Point, Calif. 92629

Filed Oct. 1, 1976, Ser. No. 728,785
Int. Cl.² B64C *31/02*
U.S. Cl. 244—16 **12 Claims**



1. A device capable of flight comprising:
a frame including first and second leading edge members, a keel, means for interconnecting the leading edge members and the keel to allow the leading edge members to be pivoted relative to the keel, and first and second cross members connectable to said first and second leading edge members, respectively, and to said keel;
flexible membrane means for forming an airfoil;
means for attaching the flexible membrane means to said frame;
said attaching means including means defining a track on said first leading edge member, and first means on the flexible membrane means for being received by said track and for cooperating therewith to attach said flexible membrane means to said first leading edge member;
means coupled to said frame for supporting a load; and
a rib and means for carrying said rib on said flexible membrane means, said first means including means for pivotally coupling the rib to the track to allow relative pivotal movement between the rib and the track.

4,116,408

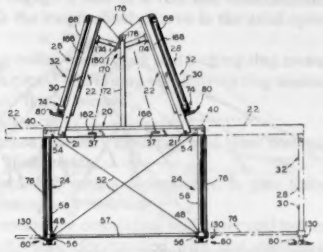
PORTABLE HELIPORT

Joe I. Soloy, The Dalles, Oreg., assignor to Soloy Conversions, Ltd., The Dalles, Oreg.

Continuation of Ser. No. 673,669, Apr. 5, 1976, abandoned, which is a continuation of Ser. No. 518,599, Oct. 29, 1974, abandoned. This application Jan. 14, 1977, Ser. No. 759,354
Int. Cl.² B64F *1/00*
U.S. Cl. 244—114 R **6 Claims**

1. In a portable heliport,
a central deck,
winch means including a central support and a pair of pads,
means detachably securing said central support of the winch means to the central deck,
deck extension means foldable into engagement with the pads,

means mounting the deck extension means foldably on the central deck,



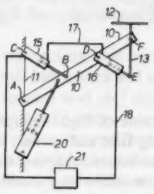
and cable means connecting the winch means to the deck extension means.

4,116,409

HYDRAULIC LEVELLING SYSTEMS FOR DRILLING MACHINES, ETC.

Antony Dobson Barber, Truro, and Zdenek Fisher, Porthleven, both of England, assignors to Compair Construction and Mining Limited, Cambourne, England

Filed Jul. 1, 1976, Ser. No. 701,803
Int. Cl.[2] E21C *11/00, 5/08*
U.S. Cl. 248—2 **15 Claims**



1. A supporting mechanism for a support seat which is capable of controlling the orientation thereof, the mechanism comprising

a jib having an inner end and an outer end, the inner end being pivotally connected along a first pivot axis to a support structure;

a support seat pivotally mounted onto said outer end of said jib, said support seat being pivotable about a second axis, said second axis being parallel to said first pivot axis;

a first hydraulic, linearly expandable and contractible jack, said first jack being pivotally connected at one end to said support structure and at the other end to said jib and capable of sensing angular movement of said jib relative to said support structure about said first pivot axis, said first jack having a closed full-bore end and an annular end;

a second hydraulic, linearly expandable and contractible jack, said second jack being pivotally connected at one end to said jib and at the other end to said support seat and capable of controlling the orientation of said support seat about said second axis, said second jack having a closed full-bore end and an annular end;

said first and second hydraulic, linearly expandable and contractible jacks being so constructed and arranged that in all angular positions of said jib a first triangle whose corners are respectively constituted by the pivotal connection point of said first jack to said support structure, the pivotal connection point of said jib to said support structure and the pivotal connection point of said first jack to said jib, is similar to but different in linear dimensions from a second triangle whose corners are respectively constituted by the pivotal connection point of said second jack to said support seat, the pivotal connection point of said jib to said support seat, and the pivotal connection point of said second jack to said jib, said first and second jacks lying in corresponding sides of said similar triangles;

first hydraulic connection means connecting said full-bore end of one of said first or second jacks with the annular end of the second of said first or second jacks, said first hydraulic connection means comprising a hydraulic connection of fixed volumetric capacity between said full-bore end and said annular end such that the displacement of a volume of a fluid from one of said first and second jacks into said connection on contraction of said one jack displaces an equal volume of fluid from said connection into the other of said jacks;

means for maintaining said first hydraulic connection means under positive hydraulic pressure; and

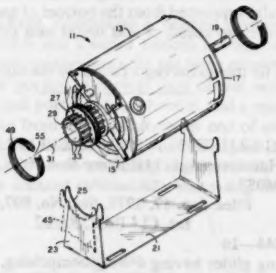
wherein each of said annular ends of said first and second jacks are smaller in effective cross-sectional area than said respective full-bore ends, and wherein the ratio of effective cross-sectional areas of said ends of said first and second jacks connected by said first hydraulic connection means is equal to the ratio of similarity of said second and first triangles, respectively, and such that on pivotal movement of said jib relative to said support structure, the ratio of corresponding changes in operative length of said first and second jacks equals the ratio of similarity of said first and second triangles, respectively, whereby said support seat is maintained in parallel orientation throughout said pivotal movement of said jib.

4,116,410

ADAPTABLE RESILIENT MOTOR MOUNTING

John H. Boyd, Jr., and Don C. Nelson, Jr., both of Fort Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.

Filed May 25, 1977, Ser. No. 800,418
Int. Cl.[2] F16M *13/00*
U.S. Cl. 248—26 **19 Claims**



1. The method of supporting a motor having cradle engageable rings each mounted on a hub at opposite ends thereof in the arms of a selected one of a plurality of different size cradle bases comprising the steps of:

sliding at least one of the cradle engaging rings axially along the motor hub until the separation between the rings is appropriate for positioning the motor adjacent the selected base with the rings in registry with corresponding base arms;

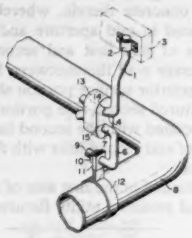
engaging the base arms with the corresponding rings; and

securing the rings to the base.

4,116,411
DEVICE FOR SUSPENDING AN EXHAUST PIPE IN VEHICLES

Hidemi Masuda, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 26, 1976, Ser. No. 745,438
Claims priority, application Japan, Sep. 17, 1976, 51-125552[U]
Int. Cl.² F16L 3/00
U.S. Cl. 248—60 5 Claims



1. A device for suspending an exhaust pipe in a vehicle having a frame and an exhaust pipe, comprising first and second rod members each having a substantially uniform and circular cross-section and being formed with a hooked portion at one end thereof, a first mounting means to mount the other end of said first rod member to said frame, a second mounting means to mount the other end of said second rod member to said exhaust pipe, and a block element made of a rubber-like elastic material having two holes therethrough, each hole having a substantially uniform and circular cross-section corresponding to said rod members and receiving one of said hooked portions of said first and second rod members in a simple substantially circular peripheral surface engagement with no bonding means being applied between said block and said hooked portions, said two holes and hooked portions being positioned so as not to be parallel with each other and so as to be substantially in the same plane.

4,116,412
RESILIENT MOUNTING FOR AN OPERATOR'S STATION ON A VEHICLE

Gerald M. Walden, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jul. 15, 1977, Ser. No. 815,953
Int. Cl.² B62D 23/00
U.S. Cl. 248—358 R 12 Claims

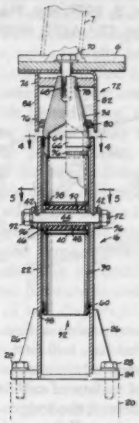
1. A mounting for removably associating a first structure with a second structure comprising:

a first hollow member affixed to said first structure;

a second member having a first portion disposed in said first hollow member; and a frustoconical-like extension integrally connected to said first portion and forming a second portion of said second member, said frustoconical-like extension extending outwardly of said first hollow member;

vibration-insulated fastening means for fixedly associating said first portion of said second member with said first hollow member; separate means insulating said second member from vibration imparted to said first hollow member;

means for removably associating said second structure with said second member including; a first plate defining a tapered opening therethrough; a second plate defining a tapered opening therethrough and of relatively larger size than said opening in said first plate; and means for associating said first and second plates with said second structure in a spaced apart relation with the axes of said tapered openings concentric so that said first and said second

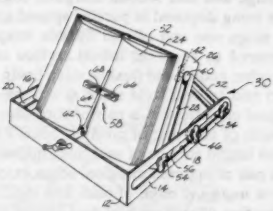


tapered openings may be placed in an overlapping relationship with said frustoconical-like extension.

4,116,413
COLLAPSIBLE BOOK STAND

Peter A. Andersen, Foxfire Apts. R4, Greenville, S.C. 29611

Filed Dec. 1, 1976, Ser. No. 746,415
Int. Cl.² A47B 97/04
U.S. Cl. 248—451 4 Claims



1. A collapsible stand for supporting a book in an inclined readable position comprising:

(a) a base portion into which a book can be positioned, said base portion having a pair of rearwardly extending sides;

(b) a substantially planar book rest;

(c) a bracket supporting said book rest;

(d) means for pivotally connecting a lower end of said bracket to one of said rearwardly extending sides;

(e) means for pivotally connecting an upper end of said bracket to said book rest;

(f) said bracket being extendable so as to vary the overall length of said bracket:

(g) an elongated slot provided in at least one of said rearwardly extending sides; and

(h) said means for pivotally connecting a lower end of said bracket to one of said rearwardly extending sides includes:

(i) a bolt extending through a lower end of said bracket and said slot provided in said one side and

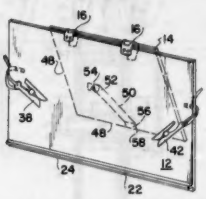
(ii) a nut carried on said bolt for securing said bracket to said side and for permitting said lower end of said bracket to be adjustable in a longitudinal direction along said side;

whereby the angle and height that said planar book rest is held relative to said base portion is adjustable for supporting a book at a desired reading angle and for accommodating different size books.

4,116,414
BOOK HOLDER

Vivian Robertson, 1100 SW. 12th St., Ft. Lauderdale, Fla. 33315

Filed Dec. 5, 1977, Ser. No. 857,242
Int. Cl.[2] A47B 97/04
U.S. Cl. 248—451 10 Claims

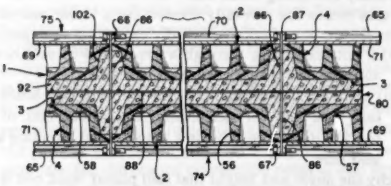


1. A book holder comprising a first rigid sheet, a second rigid sheet, an elongated bar, said first rigid sheet having said elongated bar fixedly secured thereto, said elongated bar being located on a first lateral surface of said first rigid sheet adjacent a first marginal edge thereof, the longitudinal axis of said elongated bar being disposed parallel to said first lateral surface of said first rigid sheet, said second rigid sheet hingeably secured to said first rigid sheet at a second marginal edge of said first rigid sheet, said first marginal edge and said second marginal edge of said first rigid sheet being disposed in parallel spaced apart relationship, said second rigid sheet having a first marginal edge thereof disposed substantially parallel to said first marginal edge of said first rigid sheet, said second rigid sheet having a second marginal edge thereof being located adjacent said second marginal edge of said first rigid sheet, said first marginal edge and said second marginal edge of said second rigid sheet being disposed in parallel spaced apart relationship, a flexible strap, one end of said flexible strap being disposed fixedly secured to a second lateral surface of said first rigid sheet, the other end of said flexible strap being disposed fixedly secured to said second rigid sheet at a location adjacent said first marginal edge thereof, a pair of cord-like elastic elements, one end each of said pair of cord elements fixedly secured to said second lateral surface of said first rigid sheet at a location adjacent a pair of opposed marginal edges extending transverse to said first marginal edge of said first rigid sheet, means to secure a portion of said each of said pair of cord element in a bight, a pinching device, said pinching device having a pair of arms, one end of one of said pair of arms having an eyelet-like opening, a portion of said bight passing through said opening, said means to secure including means to manually selectively adjust the length of said bight.

4,116,415
LINER FOR CONCRETE FORMS

Edward B. Ward, 820 Winchester, Kansas City, Mo. 64125

Filed Apr. 20, 1977, Ser. No. 789,451
Int. Cl.[2] E04G 11/12
U.S. Cl. 249—35 27 Claims



1. In a form for poured concrete walls having first and second panels positioned spaced apart to define a concrete receiving cavity therebetween, each of said panels having an interior surface, the improvement comprising:

(a) a first liner having a first side thereof abutting the interior surface of said first panel, and a second side thereof having a textured portion and being spaced apart from the interior surface of said second panel;

(b) a second liner having a first side thereof abutting the interior surface of said second panel, and having a second side thereof spaced apart from the second side of said first liner and forming an aperture therebetween for receiving unsolidified concrete therein, whereby unsolidified concrete is poured in said aperture and flows between the second sides of said first and second liners to form a poured concrete wall therebetween having a contoured, decorative exterior surface portion shaped in accordance with the textured second side portion of said first liner;

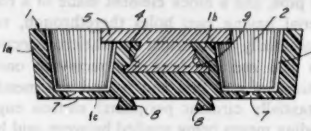
(c) means associated with the second liner for attaching the second side of said second liner with the interior surface of said wall; and

(d) means positioned in the first side of said second liner for receiving and retaining utility fixtures therein.

4,116,416
DENTAL MOLD

Claude Ginés Fernand Segura, Ave. des Pervenches, Perpignan, France (66000)

Filed Oct. 6, 1976, Ser. No. 729,950
Claims priority, application France, Oct. 6, 1975, 75 31208
Int. Cl.[2] A61C 13/12; B29C 1/16
U.S. Cl. 249—54 9 Claims



1. A mold for the temporary retention of a plurality of false roots for a multitooth denture, comprising:

a shell with a bottom, a central portion and a peripheral wall defining an upwardly open generally U-shaped trough of an outline conforming to a human jaw, said trough having a generally trapezoidal, upwardly diverging cross-section with bottom and side surfaces provided with closely spaced transverse corrugations facilitating the precise repositioning in said trough of a segment of a molded mass temporarily removed therefrom; and

a slider of generally T-shaped profile removably seated in said shell, said slider having a shelf partly overhanging said trough for holding said mass in place while giving access to false roots embedded in said mass, said slider being provided with a key forming the web of the T, said key being received in a complementary horizontal keyway formed in said central portion.

4,116,417
NEEDLE VALVE TYPE PUMP INJECTOR

Ward Orin Larsen, Rt. 1 Box 27, Glenwood, Wash. 98619

Filed Sep. 8, 1975, Ser. No. 611,338
Int. Cl.[2] F16K 1/04
U.S. Cl. 251—122 5 Claims

1. A pump injector valve apparatus comprising:

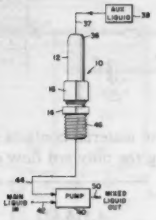
an externally threaded needle valve member having an adjusting head on one end thereof and a tapered shank at the other end thereof;

a valve seat member with a longitudinal passage therethrough having a side port opening through the side wall of the passage intermediate its opposite ends, said passage being threaded at one end for receipt of said needle valve member so that the tapered end thereof is positioned adjacent said side port;

connection means including a sleeve surrounding said needle valve member and said valve seat member, for connecting said valve apparatus to an auxiliary liquid supply and for transmitting said auxiliary liquid through said side port into said passage, said adjusting head of said needle valve member being contained within the sleeve;

means provided on said adjusting head for rotating said needle valve member to adjust the flow of said auxiliary liquid through said side port;

pump connector means including an externally threaded



tubular connector member, for connecting the outlet end of said passage in said valve seat member to a liquid pump for injecting said auxiliary liquid into the main pumped liquid; and

compression means including a compression nut, for clamping said valve seat member between said sleeve and said pump connector member, said sleeve having an external flange at one end thereof which is engaged by said compression nut and said nut being threaded onto said connector member to clamp said sleeve between said nut and said connector member.

4,116,418

FLEXIBLE COUPLINGS FOR PROVIDING FLUID COMMUNICATION BETWEEN TWO MEMBERS

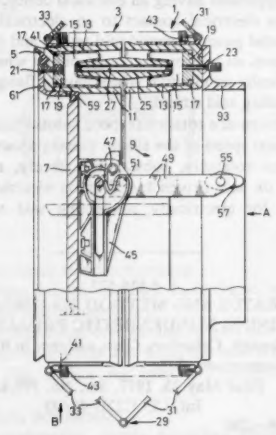
Kenneth White Pearson, and David William Thomas Richards, both of Yeovil, England, assignors to Shipowners Refrigerated Cargo Research Association, London, England

Filed Aug. 30, 1976, Ser. No. 720,045

Claims priority, application United Kingdom, Sep. 9, 1975, 37147/75

Int. Cl.[2] F16L *29/00*

U.S. Cl. 251—149.2 **16 Claims**



1. A coupling suitable for connecting an apparatus leading to the interior of a refrigerated transport container with a duct for the supply or return of fluid, said coupling comprising a generally tubular device defined by separately formed first and second ends, means carried by said first end for connection to a duct and sealing means carried by said second end for sealing abutting relationship with a flat sealing surface surrounding an aperture in a container, said generally tubular device including a rolling diaphragm fixedly connected to one of said ends, said rolling diaphragm together with portions of said one end defining an annular inflatable closed space, said rolling diaphragm having an annular face portion facing the other of said ends with said annular face portion being defined by reversely turned portions of said diaphragm defining a U-shaped cross-sectional part of variable depth, and an annular force transmitting means carried by said other end and having an end portion remote from said other end seated in said diaphragm U-shaped cross-sectional part, said force transmitting means together with said diaphragm defining a conduit between said ends, means for applying fluid pressure to said closed space to cause extension and rolling of said diaphragm relative to said force transmitting means and movement of said ends apart, whereby said tubular member is extended and said coupling moved from a withdrawn inoperative position towards an extended sealing position engagement with a container to provide a fluid passageway from a duct to the interior of a container.

4,116,419

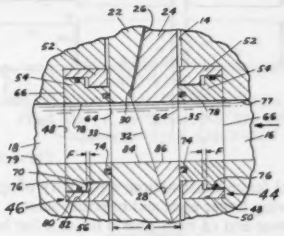
LIMITED FLOAT SEAT CONSTRUCTION FOR EXPANDING GATE VALVE

Robert J. Diehl, Vivian, La., and Robert C. Houlgrave, Houston, Tex., assignors to ACF Industries, Incorporated, New York, N.Y.

Filed Oct. 21, 1977, Ser. No. 844,251

Int. Cl.[2] F16K *3/00*

U.S. Cl. 251—196 **6 Claims**



1. In a gate valve structure having a valve body and a valve chamber therein and inlet and outlet flow passages communicating with the valve chamber, an expanding gate assembly including a gate element and segment slidably mounted together within the valve chamber for movement between open and closed positions of the gate assembly with said gate element and segment expanding away from each other at the fully open and closed positions, and an annular recess in the body around each of said flow passages at said valve chamber and defined by an end wall extending transversely to the longitudinal axis of the associated flow passageway and an outer side wall radially outwardly of the associated flow passageway extending perpendicularly to said end wall; an improved seat assembly comprising:

(a) a generally L-shaped annular seat retainer fixed within each of said recesses and having an inturned lip opposite said recess end wall, said inturned lip having an inner annular abutment facing said end wall to form a limit stop;

(b) a generally L-shaped annular seat member mounted in a complementary relation within each of said seat retainers and adjacent said recess end wall for movement between extended and retracted positions in a direction longitudinally of the associated flow passage and relative to said retainer, said seat member having an outturned lip forming an outer annular abutment facing said inner annular

abutment on said seat retainer and contacting said inner abutment at its extended position for limiting the movement of the seat member in said extended position, said seat member having a seal around the outer perimeter thereof to seal against the associated seat retainer ring; and

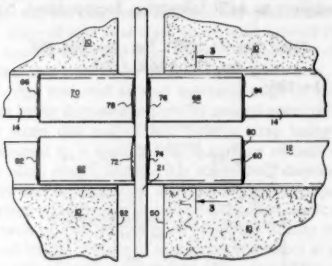
(c) an annular face seal about a front face of each of said seat members to seal against said gate assembly, the combined longitudinal outward movement of both said seat members from a retracted position in contact with said recess end wall to an extended position in contact with said inturned lip being limited to a distance less than the total distance of expansion of said gate assembly to at least around one-half said total expansion of said gate assembly where said total distance of expansion is the distance that said gate element and said segment move away from each other when said gate assembly moves from a collapsed position to an expanded position making a fluid-tight seal against both of said seats in order to minimize drag of said seat members against said gate assembly as said gate assembly is moved between said open and closed positions.

4,116,420

HORIZONTAL FENCE CONSTRUCTION

Earl T. Hazelett, 1940 Grand Ave., Grand Junction, Colo. 81501, assignor to Earl T. Hazelett, Grand Junction, Colo.

Filed Apr. 19, 1977, Ser. No. 788,804
Int. Cl.[2] E04H *17/16*
U.S. Cl. 256—24 **8 Claims**



1. In a panel fence construction: a plurality of spaced apart posts each having lower ends and opposite sides; a foundation in which a lower end of each post is fixed; a flat horizontally elongated panel disposed between said posts; said panel having opposite sides disposed vertically; said panel having upper and lower edges and opposite ends; said opposite ends disposed vertically adjacent to said opposite sides of said posts; said upper and lower edges of said panel having steel generally L-shaped in cross section edge reinforcing members fixed thereto; said posts being flat steel members having opposite edges directed generally toward opposite sides of said panels; said posts having opposite sides facing respective ends of said panels; the thickness dimension of said posts between opposite sides thereof being only a fraction of the dimension of said posts between said opposite edges thereof; steel clips fixed to said sides of said posts and fixed to said steel edge reinforcing members of said panels.

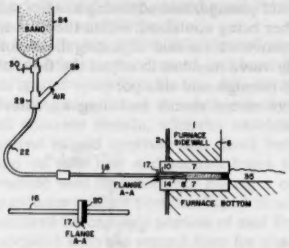
4,116,421

METHOD OF SEALING TAPHOLES IN A PHOSPHORUS FURNACE

Jerry Rowe, Pocatello, Id., assignor to FMC Corporation, Philadelphia, Pa.

Filed Jul. 25, 1977, Ser. No. 818,936
Int. Cl.[2] C21B *7/12*
U.S. Cl. 266—45 **5 Claims**

1. A method of closing a taphole in a metallurgical furnace, which comprises applying sufficient pneumatic pressure at the taphole to displace molten material from the boretube, then introducing particulate material into the resulting boretube whereby a zone of solidification is formed in the boretube



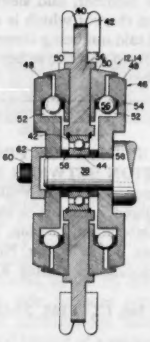
where the particulate material contacts molten furnace material thereby stopping the outward flow of molten material.

4,116,422

WIRE ANNEALING APPARATUS

Ralph A. Vogel, Three Rivers, Mich., and Robert K. Kittsmiller, Fort Wayne, Ind., assignors to Essex Group, Inc., Fort Wayne, Ind.

Filed May 16, 1977, Ser. No. 797,081
Int. Cl.[2] C21D *9/62*
U.S. Cl. 266—104 **9 Claims**



1. In an apparatus having an electrical contact pulley which serves as an electrical contact to an electrically conductive strand material passing around said pulley and pulled through said apparatus, an improved contact pulley which comprises:

an electrically conductive wheel having flanges near its rim for guiding said strand;

a shaft driven at a rotational speed substantially equal to the rotational speed of the strand passing around said wheel;

means for rotatably, substantially freely, mounting said wheel on said driven low friction electrical connection means for electrically connecting said shaft and said wheel.

4,116,423

APPARATUS AND METHOD TO FORM METAL CONTAINING NONDENDRITIC PRIMARY SOLIDS

Foster C. Bennett, Columbus, Ohio, assignor to Rheocast Corporation, Germantown, Wis.

Filed May 23, 1977, Ser. No. 799,429
Int. Cl.[2] C22B *45/00*
U.S. Cl. 266—200 **4 Claims**

1. An apparatus to form metal containing degenerate dendrites comprising:

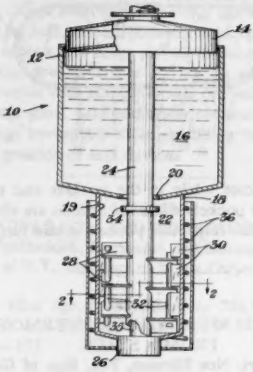
a means to contain a molten metal with an inlet suitable to

feed metal and an outlet suitable to discharge the molten metal;

a means to receive the molten metal from said containing means; and to contain the molten metal during agitation and cooling of the molten metal;

a means in combination with said metal receiving means to control the temperature of the molten metal;

a rotatable means generally axially positioned within said metal receiving means, said rotatable means having a



rotatable support with spaced apart molten metal agitating means attached to the support and extending in a generally outwardly direction therefrom toward an inner wall portion of said metal receiving means, the agitating means being spaced apart from the inner wall portion;

a means to remove solid metal deposited on the inner wall portion of said metal receiving means in operable combination with the agitating means;

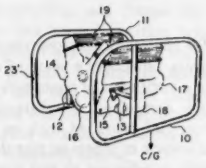
said metal removal means being pivotably attached to the agitating means.

4,116,424

ENGINE REPAIR STAND

Theodore Varga, Atlantic City; Arthur Devine, Jr., and Warren Meikle, both of Ventnor, all of N.J., assignors to Meikle & Devine, Inc., Hammonton, N.J.

Filed Oct. 31, 1977, Ser. No. 847,133
Int. Cl.² B23Q *1/04*
U.S. Cl. 269—55 **12 Claims**



1. An engine repair stand comprising

(a) two holding frames, one right hand frame, and one left hand frame, each comprising,

(b) a bottom horizontal base having at least two points in a linear relationship such that when the base is placed on a relatively flat surface the base is supported on those points,

(c) two upright side struts,

(d) bottom connecting means providing rigid structural connection between the bottom horizontal base and each side strut, one strut being located near the front of the engine to be held and one strut being close to the rear of the engine to be held,

(e) a top horizontal base having at least two points in linear relationship located along the top horizontal base such that when the repair stand is turned up-side-down while holding the engine, that these points rest and support the repair stand lifting the engine off the flat surface,

(f) top connecting means providing rigid structural connection at each end of the top horizontal base to the top of the two side struts,

(g) at least one vertical support member which is rigidly and structurally connected between the bottom horizontal base and the top horizontal base capable of transmitting force directly to the points on the bottom horizontal base or to the points on the top horizontal base depending on the altitude of the engine stand,

(h) a horizontal cantilever member structurally connected to the vertical support member extending toward the engine,

(i) a mounting means structurally and rigidly attached to the cantilever member and capable of being demountably attached to the engine mount of engines of varying type and size at a location on the engine where the engine is normally mounted in the vehicle in which it is used and,

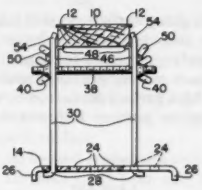
(j) the size and position of the elements being such that when the right hand frame is attached to the right hand side of the engine and the left hand holding frame is attached to the left hand side of the engine, that the engine is suspended off the flat surface on which the repair stand is resting and the engine is aligned such that its sides face the respective holding frames.

4,116,425

SKI VISE

Oiva J. Pesola, 29 Normal Rd., Fitchburg, Mass. 01420

Filed Mar. 6, 1978, Ser. No. 883,494
Int. Cl.² B25B *5/04*
U.S. Cl. 269—152 **12 Claims**



1. A ski vise comprising a base, a plurality of parallel rows of parallel slots in said base, said rows extending generally from side to side of the base,

a plurality of pairs of ski clamping plates, means on each plate for insertion in selected slots, said plates being arranged in pairs on said base facing each other and being generally parallel,

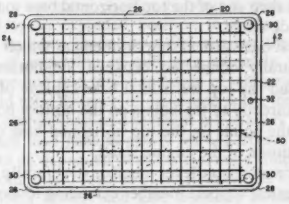
means for engaging said plates in pairs and drawing the same toward each other, said last named means extending between the plates of said pairs of plates, and holding the plates generally upright in cooperation with said first named means,

said clamping plates being adapted to clamp a ski in generally parallel relationship to said plates at the top edges of said clamping plates.

4,116,426
CUTTING BOARD

Milton Kessler, 6690 Harrington Ave., Youngstown, Ohio 44512

Filed Mar. 1, 1977, Ser. No. 773,285
Int. Cl.[2] B23Q 3/00
U.S. Cl. 269—307 5 Claims



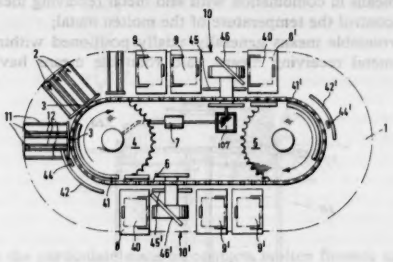
1. A cutting board, consisting of:
(a) a sheet of transparent plastics material having a top surface and an underlying bottom surface;
(b) the top surface including an embossed cutting surface portion extending over the majority of the area of the top surface and being defined by a multiplicity of spaced projections which extend upwardly from a lower, substantially planar surface segment and which have substantially flat tops defining upper surface segments, the lower and upper surface segments extending in planes substantially paralleling the plane of the underlying bottom surface, the space projections being separated one from another by the order of magnitude of the surface dimensions of the projections;
(c) the bottom surface including a smooth, planar back surface portion extending over the majority of the area of the bottom surface and underlying the embossed cutting surface portion;
(d) design means including a grid of intersecting guidelines formed directly on the back surface portion and being viewable through the embossed cutting surface portion to facilitate the trimming of articles supported on the embossed cutting surface portion;
(e) the design means additionally including indicia means adjacent selected ones of the guidelines for facilitating reference to the selected guidelines during the trimming of articles supported on the embossed cutting, surface portion; and,
(f) whereby the cutting surface portion has a major portion of its surface area defined by substantially flat surface segments extending in planes substantially paralleling the plane of the back surface portion thereby permitting the design on the back surface portion to be viewable through the cutting surface portion with minimal optical distortion.

4,116,427
APPARATUS FOR STUFFING NEWSPAPERS OR THE LIKE

Hans Müller, Zofingen, Switzerland, assignor to GRAPHA-Holding AG., Hergiswil, Switzerland

Filed Feb. 1, 1977, Ser. No. 764,631
Claims priority, application Switzerland, Feb. 19, 1976, 2025/76
Int. Cl.[2] B65H 39/02
U.S. Cl. 270—54 11 Claims

1. In an apparatus for collating and otherwise manipulating sheet material articles, particularly in a newspaper stuffing apparatus, a combination comprising a plurality of pockets; means for transporting said pockets in a predetermined direction along a predetermined path; means for feeding different sheet material articles into successive pockets in at least two different portions of said path; and means for withdrawing the articles from successive pockets in a further portion of said path including means to allow the articles to be withdrawn from the respective pockets, said further portion being located downstream of said first mentioned portions, as considered in said direction, said withdrawing means including means for

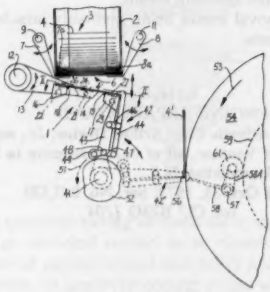


gripping the articles while in the pockets and moving the articles out of the pockets when the articles are allowed to be withdrawn from the respective pockets at said further portion of said path.

4,116,428
APPARATUS FOR SEPARATING LOWERMOST SHEETS FROM A STACK

Bernhard Schubert, Neu Börnsen, Fed. Rep. of Germany, assignor to Hauni-Werke Körber & Co. KG., Fed. Rep. of Germany

Filed Dec. 1, 1975, Ser. No. 636,580
Claims priority, application Fed. Rep. of Germany, Nov. 30, 1974, 2456701; Dec. 7, 1974, 2458056
Int. Cl.[2] B65H 5/08
U.S. Cl. 271—14 7 Claims



1. In an apparatus for removing the lowermost sheet of a stack of superposed sheets, especially a stack of sheets which are to be converted into constituents of containers for smokers' products, a combination comprising a substantially upright magazine having a lower end provided with an opening and being arranged to store a stack of sheets so that the lowermost sheet of the stack therein is adjacent to and can pass downwardly through said opening; a removing device movable substantially at right angles to the planes of sheets in said magazine between a first position in which said device supports the lowermost sheet of the stack in said magazine and a second position, at least the major component of the initial stage of movement of said removing device from said first to said second position being downwardly and substantially at right angles to said planes and said removing device having a first element which supports the lowermost sheet from below in said first position of said device, means for flexing at least one marginal portion of the lowermost sheet of the stack in said magazine to thereby separate said one marginal portion from

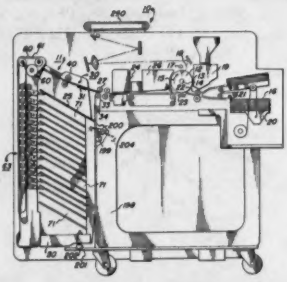
the next-to-the-lowermost sheet of the stack, and means for maintaining the lowermost sheet in contact with said device during subsequent movement of said device from said first to said second position so that the lowermost sheet becomes fully separated from the next-to-the-lowermost sheet during said initial stage; means for moving said device between said first and second positions; at least one retaining member movable with respect to said magazine to and from an operative position in which a portion of said member supports said one marginal portion of the lowermost sheet from below; and means for transferring sheets from said removing device while said device dwells in said second position, said transferring means comprising at least one tongs pivotable about a fixed axis and said removing device further having an additional element which is movable with respect to said one marginal portion of the lowermost sheet, said additional element having a recess and said tongs having a portion extending into said recess in said second position of said device.

4,116,429

SORTING APPARATUS AND REPRODUCING MACHINE

Warren T. VanBuskirk, Rochester, and Donald W. Tates, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 4, 1977, Ser. No. 784,500
Int. Cl.[2] B65H *39/10*
U.S. Cl. 271—173 **19 Claims**



1. In a sorting apparatus for collating the output of a reproducing machine, said apparatus comprising:

a plurality of sheet receiving bins;

a first frame for supporting said sheet receiving bins;

sheet transport means for transporting said sheets to said bins;

a second frame for supporting said sheet transport means;

means for supporting said frames for relative movement between a first closed position wherein said transport means is operatively associated with said bins and a second open position to provide access to said transport means and said bins for sheet clearance therefrom; the improvement wherein, said apparatus further includes:

means supported in said second frame for guiding a sheet along said transport means;

means for supporting said guide means for movement between a first position wherein said guide means is spaced closely adjacent to said transport means and a second position wherein said guide means is more widely spaced apart from said transport means to allow sheets to be removed from between said guide means and said transport means; and

means for moving said guide means between said first position and said second position in response to the relative movement of said frames from said first closed position to said second position;

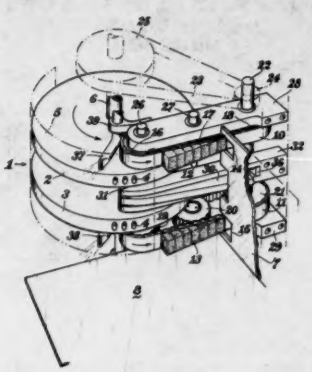
whereby clearance of said sheets from said sheet transport means is facilitated.

4,116,430

STACKING APPARATUS FOR FLEXIBLE SHEETS

Roy E. Winchester, St. Albans; Michael J. Marjoran, Rickmansworth, and Roger O'Brien, Watford, all of England, assignors to De La Rue Crosfield Limited, London, England

Continuation of Ser. No. 723,298, Sep. 14, 1976, abandoned. This application Dec. 21, 1977, Ser. No. 863,060
Claims priority, application United Kingdom, Sep. 16, 1975, 37988/75
Int. Cl.[2] B65H *29/24, 29/38*
U.S. Cl. 271—177 **7 Claims**



1. Apparatus for stacking flexible sheets comprising:

a sheet transporting drum comprising a pair of axially aligned discs, each having in its periphery at least one vacuum port in communication with a source of suction to grip and propel a sheet;

a driving means to rotate said drum;

first and second endless belts carried upon respective first and third pulleys of equal diameter disposed wholly within an area bounded by an axial projection of said drum and having an axis offset with respect to the axis of the drum and upon respective second and fourth equal-diameter pulleys disposed at least partially outside said area, said first, second, third and fourth pulleys being sited so that a rectilinear part of each of the belts defines a delivery flow-line for the sheets substantially tangential to the periphery of the drum;

means for driving said belts at substantially the same speed as the peripheral speed of the transporting drum;

a support surface disposed substantially at rightangles to said flow-line and adapted to support in a stack the leading edges of successive sheets fed along said flow-line;

a pressure-member arranged to contact a face of a first sheet fed to said support surface;

biasing means acting on said pressure-member, said pressure-member being movable away from said flow-line against the bias of said biasing means as the sheets are progressively fed to said support surface;

a wedge-shaped separation member attached to the external surface of each of the said belts and protruding so as to overlap the flow-line, each wedge-shaped separation member being arranged to move along said rectilinear delivery flow-line in advance of the leading edge of a sheet propelled by the drum and fed into the flow-line and being oriented with respect to the flow-line such that said leading edge of the sheet follows immediately behind the thick end of the wedge-shaped member, said separation member thereby displacing sheets already in said stack and creating a space for receiving the leading edge of said drum-propelled sheet up to said support surface; and

an elongate retardation means having one end located between the two drum discs and between the two endless belts and the other end biased towards the flow-line and so arranged that a sheet approaching the support surface

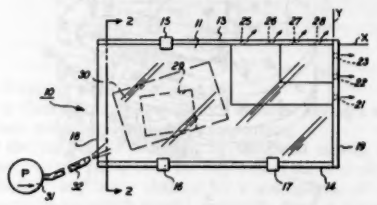
contacts said retardation means after the face of the stack is moved out of the path of the sheet by said wedge-shaped separation members.

4,116,431

METHOD FOR TRANSPORTING AND REGISTERING STACKED SHEETS

Klaus K. Stange, Pittsford; Richard E. Smith, Webster; Thomas J. Hamlin, Macedon, and James R. Cassano, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 627,572, Oct. 31, 1975. This application Jun. 27, 1977, Ser. No. 809,952
Int. Cl.[2] B65H *9/00*
U.S. Cl. 271—236 **4 Claims**



1. A method for registering a stack of sheets with respect to perpendicularly related axes, the sheets having length and width dimensions within predetermined ranges, comprising the steps of:

(a) providing a sleeve for internally accommodating said stack of sheets, at least one point on an inner narrow wall of the sleeve being aligned in parallel with one of the axes;

(b) providing a stop at one end of the sleeve, the stop having at least one point aligned in parallel with the other of the axes;

(c) placing said stack of sheets in the sleeve; and

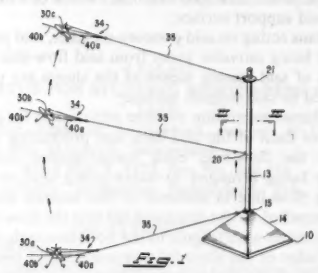
(d) providing in the sleeve a fluid stream having velocity components normal to each of the axes, whereby the stream moves the stack of sheets in the sleeve in unison and into abutment with said points.

4,116,432

STABILIZED PYLON AND MODEL AIRCRAFT SYSTEM

John J. Feeney, 1154 Dorset La., Costa Mesa, Calif. 92626

Filed Mar. 28, 1977, Ser. No. 781,776
Int. Cl.[2] A63H *27/04*
U.S. Cl. 272—31 A **10 Claims**



1. A stabilized gasoline powered type model airplane and pylon assembly comprising:

a thin vertically extending pylon of substantially uniform cross-section;

means for supporting said pylon vertically without circumferential lateral interference;

a gasoline powered type model airplane;

means for securing said airplane to said pylon, said securing means including a small bearing member or ring freely mounted on said pylon and a restraint line extending between said model airplane and said bearing member;

means for adjusting said airplane for climbing flight above the bearing member or ring;

flexible damping and stop means secured near an upper end of said pylon having an undersurface adapted to engage a portion of said securing means in any rotational position of said securing means for reducing vertical oscillation of said model during flight, whereby said model airplane is constrained to take off, circle about said pylon, climb the height of said pylon, so that said plane is circling at an elevation above the elevation of said damping and stop means; and, following engagement between said portion of said securing means and said flexible damping and stop means, to continue circular flight about said upper end of said pylon until fuel is exhausted, and to then glide to a landing; and

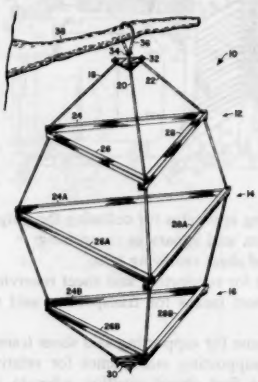
means for providing vertical clearance around said pylon and above said damping and stop means to facilitate climbing flight to an elevation above the damping and stop means.

4,116,433

CLIMBING TYPE GYMNASTIC APPARATUS

Dieter F. Koerner, 2701 E. Ironwood Dr., Phoenix, Ariz. 85028

Filed Aug. 30, 1976, Ser. No. 718,947
Int. Cl.[2] A63G *9/00*
U.S. Cl. 272—85 **3 Claims**



1. A freely suspended climbing apparatus comprising, in combination:

(a) a plurality of rope-like members,

(b) at least two spaced bar-type element means mounted on said rope-like members for providing bar-type supports for climbing or gymnastic use,

(c) said spaced bar-type element means comprising at least a pair of separate triangular shaped elements,

(d) said plurality of rope-like members comprising three ropes supporting each of said triangular shaped elements spaced apart on said three ropes,

(e) said spaced bar-type element means comprising three separate triangular shaped elements spaced apart from each other on said three ropes, and

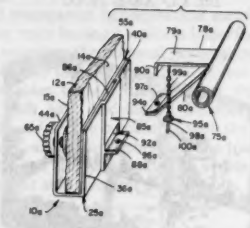
(f) said triangular shaped elements each consisting of three separate bar-type members, one end of each of said three separate bar-type members overlapping the end of the adjacent bar-type member.

4,116,434

SIT-UP EXERCISE APPARATUS

Morton J. Bernstein, 3636 Graystone Ave., Bronx, N.Y. 10463

Filed Mar. 15, 1977, Ser. No. 777,638
Int. Cl.[2] A63B *23/02*
U.S. Cl. 272—93 33 Claims



1. A sit-up exercise apparatus adapted to be utilized in conjunction with a door having spaced apart vertically extending surfaces and a bottom intermediate said surfaces, said apparatus comprising:

A. frame means having oppositely disposed sides and adapted to be removably secured to the door, said frame means comprising:

(1) an elongated base adapted to extend below said bottom of the door,

(2) front and rear members, each one of said members having an oppositely disposed lower end connected to said base and an upper end with spaced apart inner and outer walls intermediate said ends, said inner walls adapted to extend in overlapping relation with said surfaces of the door, and

(3) said inner walls oppositely disposed with respect to each other defining a space therebetween greater than the width of the door defined by said surfaces so as to readily permit the positionment of the door therebetween,

B. clamping means operatively connected to one of said members and extending inwardly of said inner wall for releasably clamping one of said surfaces of the door, such that said frame is fixedly secured to the door at a selected position thereon and may be readily removed from securement therewith by releasing said clamping means,

C. said clamping means comprises a locking element being independently adjustable and having a threaded section extending in threaded engagement through one of said members with a shoe at one end of said threaded section for abutting engagement with said surface of the door and a handle at the opposite end of said threaded section so as to facilitate adjustment thereof,

D. supporting means extending outwardly from one of said members on said frame means and adapted to extend at a height above said base so as to be readily engageable by the feet of the user of the sit-up exercise apparatus,

E. coupling means for releasably securing said supporting means to said frame means so as to permit said supporting means to be dis-assembled therefrom when the sit-up apparatus is not in use such that said frame means may remain assembled with the door by means of said clamping means,

F. said supporting means comprises:

(1) a support element having spaced apart free ends, and extending in a plane substantially parallel to said member for engagement by the insteps of the user of the sit-up apparatus, and

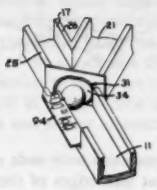
(2) a bracket extending between said support element and said member intermediate said spaced apart free ends so as to rigidly retain said support element in fixed relationship to said frame means, said coupling means releasably securing said bracket to said frame means.

4,116,435

AUTOMATIC CUE BALL SEPARATING DEVICE FOR BILLIARD TABLES

Randy D. Sines, P.O. Box 2006, Great Falls, Mont. 59403, and John F. Curran, Spokane, Wash., assignors to Randy D. Sines, Great Falls, Mont.

Filed Mar. 18, 1977, Ser. No. 779,252
Int. Cl.[2] A63D *15/00*
U.S. Cl. 209—570 9 Claims



1. An automatic cue ball separating device for separating a metallic containing cue ball from nonmetallic object balls in a billiard table, in which the billiard table has a single file ball return run along which the cue and object balls roll and a cue ball return run leading from a junction with the single file ball return run, comprising:

an induction sensing coil mounted on said table adjacent the junction having a plurality of encircling loops extending about a central aperture with the loops capable of generating a concentrated oscillating electrical field in the central aperture;

said central aperture having dimensions sufficient so that the sensing induction coil is transversely mounted at an acute angle significantly less than 90° to the path of the rolling balls in the single file ball return run and facing the cue ball return run with the balls rolling unobstructed through the central aperture;

voltage means operatively connected to the sensing induction coil for applying an AC voltage to the coil to generate an oscillating electrical field;

detecting network means operatively connected to the induction sensing coil for detecting the presence of the cue ball in the oscillating electrical field; and

deflection means adjacent the central aperture and responsive to the detection of the cue ball passing through the central aperture for deflecting the cue ball from the single file ball return run to the cue ball return run while the cue ball is passing through the central aperture.

4,116,436

BALL-COLLECTING APPARATUS

Gunnar Björhn, Furusundsgatan 7, Stockholm, Sweden

Filed Apr. 15, 1977, Ser. No. 788,016
Claims priority, application Sweden, Apr. 28, 1976, 7604916
Int. Cl.[2] A63B *61/00*
U.S. Cl. 273—29 R 7 Claims

1. An apparatus useful for collecting tennis balls on a tennis court half comprising

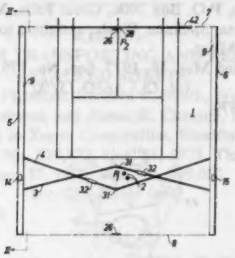
two ribs, each rib extending close to the court surface between two opposite side edges of the court half (1), one rib normally being located along each one of the two other side edges of the court half;

drive means (51–54; 61–64; 71–73) arranged to displace the ribs (3,4) towards each other while conveying balls such that these are collected in a limited area, and to displace the ribs into their normal positions,

at least one contrl means (14,15; 28) arranged actuatable from a position (P_1; P_2) on the court half,

said control means being arranged to control the drive

means, and said control position being located in the ball collecting area, and



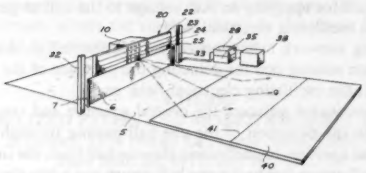
means arranged to maintain both ends of the ribs close to respective adjacent side edges of the court half during displacement of the ribs.

4,116,437

TENNIS TRAINING AND RATING APPARATUS

Neil E. Johnson, Three Woodbridge Ave., New Monmouth, N.J. 07748

Filed Feb. 8, 1973, Ser. No. 330,467
Int. Cl.[2] A63B *6/00*
U.S. Cl. 273—29 A **2 Claims**



1. A tennis training and rating apparatus comprising: a playing area having opposite ends; ball-delivering means for individually delivering tennis balls into said playing area so that they may be returned by a player during use of the apparatus; a tennis net disposed on said playing area transversely thereof; and ball-accuracy sensing means for sensing the accuracy of placement of the tennis balls returned by the player against a predetermined target area positioned in a plane corresponding to the plane of said tennis net, and providing an output accuracy signal having a value dependent upon which portion of the target area the ball strikes, said target area comprising a plurality of individual target sections each having a ball-striking surface on which the returned balls initially strike on the fly and before bouncing when hitting said target area and each mounted for actuation independently of the others, means mounting said plurality of target sections in vertically superposed relationship one above the other with their corresponding ball-striking surfaces lying in vertical superposition and substantially aligned in the plane of said tennis net, and means for providing a different output accuracy signal in response to actuation of each target section including means for providing a signal having a different value in response to actuation of each target section.

4,116,438

TABLE TENNIS ROBOT

Gustave Berliner, 3243 NE. 143rd Ave., Portland, Oreg. 97230

Continuation of Ser. No. 579,929, May 22, 1975, abandoned, which is a division of Ser. No. 504,861, Sep. 11, 1974, abandoned. This application Mar. 15, 1977, Ser. No. 777,830
Int. Cl.[2] A63B *39/00*
U.S. Cl. 273—30 **6 Claims**

6. In a ball-throwing robot,

a game table,

generally vertical net means for catching balls manually hit back over the game table and including a bottom collection portion at a predetermined height which is no higher than the level of a game table with which the robot is to be used, mechanical throwing means for throwing balls in a direction away from the net means and from a height above said predetermined height,

means for oscillating the throwing means,

and hopper means including means for taking balls from the bottom collection portion, elevating the balls to the throwing means and feeding the balls to the throwing means,

the hopper means including a hopper container for holding a large number of balls, a ball conduit leading upwardly from the bottom collection portion of the net means to the hopper container, and means for creating a partial vacuum in the hopper container and the ball conduit to draw balls through the ball conduit into the hopper container,

the entire throwing means and the bottom of the hopper container being above said predetermined height,

means for oscillating the hopper container and the throwing means therewith to periodically change the direction of throw, the throwing means serving to periodically throw balls.

4,116,439

POOL BALL

Robert James Chavarria, Fountain Valley, Calif., and Clark Berg Foster, Seattle, Wash., assignors to C.F.F. Inc., Bloomington, Calif.

Filed Sep. 30, 1976, Ser. No. 728,498
Int. Cl.[2] A63B *37/04, 37/12*
U.S. Cl. 273—59 A **1 Claim**

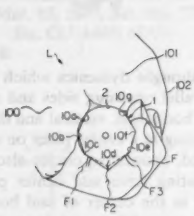
1. A pool ball comprising, in combination:

(a) a cylindrical object having identical numeral designations on its opposite ends;
(b) a colored disc member surrounding in continuous engagement the complete cylindrical surface of said object resulting in a disc-shaped assembly with said numeral designations on opposite sides of said disc-shaped assembly; and,
(c) a solid transparent hemispherical member comprised of polyester resin having a uniform imperforate surface completely covering the numeral designation on each of said opposite ends of said cylindrical object and each of the opposite sides of said disc member thereby forming a sphere with said disc-shaped assembly, the geometric center of said sphere coinciding with the center of gravity of said disc-shaped assembly, and the transparency of said hemispherical members rendering visible said colored disc member and said numeral designations.

4,116,440
GOLF CLUB GRIP

Hideyuki Takeshima, Kyoto, Japan, assignor to Hiroshi Kawamula, Tokyo, Japan

Filed Oct. 7, 1976, Ser. No. 730,607
Int. Cl.[2] A63B *53/14*
U.S. Cl. 273—81.4 **2 Claims**

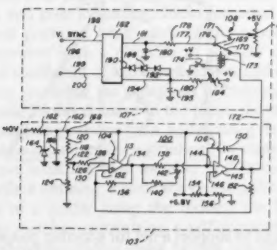


1. An improved tapered generally cylindrical golf club grip formed of elastomeric material, the improvement comprises: providing the surfaces of said grip with an arcuate surface and six planar surfaces disposed to provide a symmetrical grip when taken in cross-section and having two planar surfaces disposed opposite to the arcuate surface broader in width than the other four planar surfaces, to thereby form an extended edge surface therebetween.

4,116,441
MOVING GOALIE CIRCUIT FOR A MANUALLY CONTROLLED ELECTRONIC VIDEO GAME

Robert Ralph Runte, 912 Sandborn, Palatine, Ill. 60067, and Theodore A. Mau, Chicago, Ill., assignors to Robert Ralph Runte, Palatine, Ill.

Filed Oct. 29, 1976, Ser. No. 736,938
Int. Cl.[2] A63F *7/06*
U.S. Cl. 273—85 G **11 Claims**

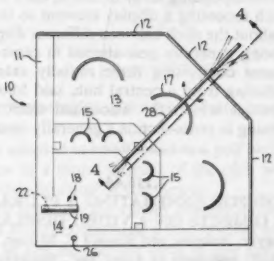


1. A moving goalie circuit for use with electronic visual games, for causing a blocking cursor to move periodically back and forth across a playing screen of the electronic visual game, comprising: a repetitive signal generator, said repetitive signal generator generating a periodic reference control signal; a reference signal generator generating a periodic reference signal; and a position control connected to said repetitive signal generator and said reference signal generator, said position control receiving said periodic reference signal at a first time, said position control producing a timed signal at a second time, said first time and said second time being separated by a time difference, said time difference being proportional to an amplitude of said periodic signal; means defining an elongated fixed target area extending in a certain direction on the playing screen; and means responsive to said timed signal for controlling the movement of the cursor in a direction parallel to the first-mentioned direction to cause the cursor to move repetitively back and forth in said direction spaced from said fixed target area to block and expose alternatingly said target area.

4,116,442
SIMULATED BASEBALL GAME

George W. Dickey, 1421 N. University, N-125, Little Rock, Ark. 72207

Filed Aug. 12, 1977, Ser. No. 824,173
Int. Cl.[2] A63F *7/06*
U.S. Cl. 273—89 **5 Claims**

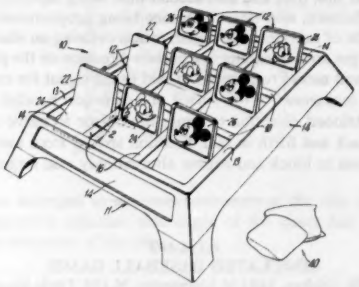


1. In a simulated baseball game including a board having an upper playing surface with upstanding walls attached to marginal edges thereof forming a fence, markings provided on said surface in the manner of a baseball field, and simulated players at infield and outfield positions in the form of upstanding interceptors mounted on said surface, the improvement comprising:
a bat disposed at a home plate position of said surface as marked, said bat comprising a substantially L-shaped member, one leg of said member having a lower surface resting on said playing surface and having opposing side surfaces, the other leg of said member extending downwardly through a first opening provided in said board for rotatable movement about the central axis thereof, and a launcher for directing a ball to be used in playing the game toward said one leg, said launcher comprising an elongated guide element in the form of a hollow tube extending toward said bat, said guide element having one end portion initially lying flatly against said playing surface, a central portion of said tube being disposed at an angle to said one end portion and resting on an upper edge of one of said walls, and an end portion of said guide element opposite said one end portion extending upwardly at an angle to said central portion and forming a handle for said tube, whereby the ball may be directed by said launcher for rolling along said playing surface in different directions toward said bat as said central portion is rotated about its axis upon movement of said handle so that the ball may be batted by one of said side surfaces of said one leg as said other leg is rotated in one direction about said axis and toward said launcher.

4,116,443
PIVOTING TARGET ARRAY GAME

Steven R. Dorfman, Levittown, N.Y., assignor to L.J.N. Toys, Ltd., New York, N.Y.

Filed Jun. 20, 1977, Ser. No. 807,918
Int. Cl.[2] A63B 63/04; F41J 7/00
U.S. Cl. 273—95 R 7 Claims

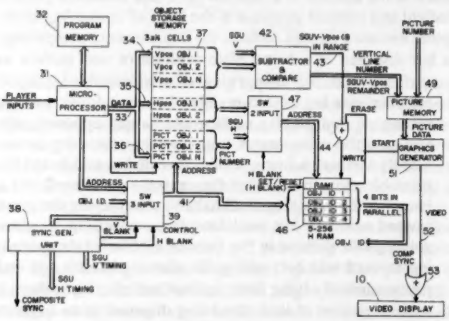


1. A game apparatus comprising a body structure; an array of display elements positioned for viewing from a predetermined side thereof and arranged in a series of rows extending in a first direction and a series of columns extending in a second direction; a corresponding array of shafts, each secured to said body and each mounting a display element to the body structure to turn about the shaft between different display positions, each shaft being generally pear-shaped in cross-section; each display element comprising three radially extending planar positions radiating from a central hub, said hub including an aperture through which the associated shaft extends, said aperture defining in cross-section a generally isosceles triangle.

4,116,444
METHOD FOR GENERATING A PLURALITY OF MOVING OBJECTS ON A VIDEO DISPLAY SCREEN

Steven T. Mayer, Auburn, and Ronald E. Milner, Grass Valley, both of Calif., assignors to Atari, Inc., Sunnyvale, Calif.

Filed Jul. 16, 1976, Ser. No. 706,121
Int. Cl.[2] A63F 9/02
U.S. Cl. 273—101.2 7 Claims

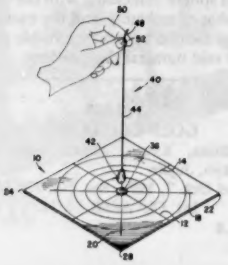


6. A method for generating complex fixed objects on a raster scan video display screen around which a plurality of moving objects move including the steps of storing data representative of the shape of segments of said fixed objects which may be displayed in more than one angular orientation, storing binary data with one portion indicative of said shape of said segment and another portion its angular orientation, in response to said one portion of binary data, reading out and displaying said data representative of the shape of a predetermined segment, and rotating such segment, to the proper angular orientation in response to said other portion, and concurrently displaying in contiguous relationship said data representative of the shape of said predetermined segment in a plurality of angular orientations.

4,116,445
THOUGHT DYNAMICS GAME

Gerald Forbes, 11515 Wood St., Maple Ridge, British Columbia, Canada

Filed Aug. 22, 1977, Ser. No. 795,232
Int. Cl.[2] A63F 9/18
U.S. Cl. 273—161 1 Claim

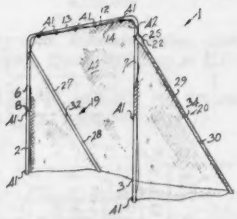


1. A game of thought dynamics which comprises a game board having parallel opposing sides and ends and inscribed with intersecting horizontal, vertical and diagonal lines, all of said lines intersecting at a center point on said game board, a plurality of spaced, concentric circles also inscribed on said game board radiating from said center point, a removable magnet provided in the center of said board overlying said center point, and a pendulum weighted element suspendible from an elongated support over said center point in a manner such that said weighted element is free to swing in any linear or circular direction consistent with said inscribed lines, said inscribed lines serving as thought guides, when supported by a player holding the free end of said elongated support, wherein said weighted element is formed of lead, and wherein the lower end of said lead weighted element has a minor amount of soft iron bonded thereto.

4,116,446
GAME NET SUPPORT APPARATUS

Roger E. Thompson, Adelaide, Australia, assignor to R.E.T. Nominees Pty. Ltd., Adelaide, Australia

Filed Nov. 3, 1976, Ser. No. 738,448
Int. Cl.[2] A63B 67/00
U.S. Cl. 273—181 F 1 Claim



1. Apparatus to support a net for sporting purposes including a first two tubular rods, each having one end thereof tapered so as to be adapted to be engageable within the ground and supported vertically by such grounding engagement, a second two tubular rods; each having a lower end adapted to engage and

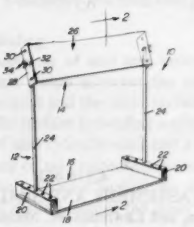
be supported vertically by an upper end of one of the first two rods, a cross-bar constituted by at least two tubular separable rods, said cross-bar including downwardly depending end portions adapted to be removably engageable with, in each case, the upper end of the said second tubular rods, and two rearwardly extending downwardly inclined stabilizing legs, each stabilizing leg being removably securable at an upper end to one of the vertically aligned portions of the rod, and, at a lower end, in each case, adapted to be at least ground engaging, each stabilizing leg being characterized by including at least two end to end separably engaging tubular rods, the arrangement being characterized in that at least one of the stabilizing rods from each leg is adapted to detachably engage in entering relationship at least one of the vertical rods, and net engaging means located in spaced apart positions along at least some of the said tubular rods, and adapted to retain a net with respect to the rods; and said net engaging means being characterized by including a resilient U-shaped clip adapted to engage around any of said rods with resilient holding pressure and support a net thereby.

4,116,447

METHOD AND APPARATUS FOR PRACTICING GOLF BALL CHIPPING AND PUTTING SHOTS

Albert Becker, 1536 Sunshine Ave., Port St. Lucie, Fla. 33452

Filed Mar. 15, 1977, Ser. No. 777,925
Int. Cl.[2] A63B *69/36*
U.S. Cl. 273—183 B **2 Claims**



1. A golf chipping and putting trainer, comprising, in combination:

(a) a support assembly extending above a support surface; and

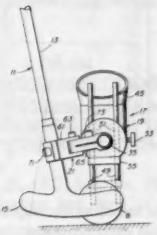
(b) guide means mounted on the support assembly and disposed spaced above the support surface for forcing the arm of a golfer swinging an untethered golf club at a ball on the support surface to pass along the guide means and swing in a straight line, the support assembly including a longitudinally extending base member provided with a pair of longitudinally spaced sockets, and poles removably disposed in the sockets and attached to the guide means for supporting the guide means in spaced relation above the base member, the base member comprising a longitudinally extending plate having longitudinally spaced end portions, and pole mounting blocks mounted on the plate at the end portions, with each of the mounting blocks being provided with a plurality of sockets spaced transversely of the extent of the base member and arranged for selectively receiving the poles and permitting adjustment of the guide means relative to the plate, the plate forming a feet positioning surface for a golfer using the trainer, the guide means including a longitudinally extending member coextensive with the base member and forming a planar guide surface defining a path above the golfer's knees for the arms of a golfer using the trainer, the longitudially extending member comprising a self-supporting, longitudinally extending, planar sheet having spaced ends terminating in codirectionally extending flanges disposed substantially perpendicularly to the plane of the sheet, each of the flanges being provided with a plurality of holes, the poles each having upper portions provided with an aperture mating with one of the holes provided in the associated one of the flanges, and the support further including wing nut fasteners means for selectively and adjustably attachably attaching the sheet to the poles, and the lower edge of said planar sheet being located a substantial distance above said base member and not connected thereto whereby said planar sheet including said lower edge may be angularly adjusted relative to said base member.

4,116,448

GOLF PRACTICE SIGHTING DEVICE

Arthur E. Crowe, Jr., 12 Ruthellen Rd., Framingham, Mass. 01701

Filed Dec. 20, 1976, Ser. No. 752,783
Int. Cl.[2] A63B *69/36*
U.S. Cl. 273—186 A **5 Claims**



1. A golf practice sighting device for attachment to a golf club comprising:

(a) a viewer adapted to be attached to a golf club for providing a view of a target in front of the club when looking down in the direction of the viewer,

(b) means for attaching the viewer directly to the shaft of the club, said means comprising a first bracket adapted to be attached at one end to the shaft of the golf club and a second bracket mounted at one end on to the first bracket for pivotal movement about an axis parallel to the shaft of the club and pivotally attached at the other end to the viewer so as to provide for pivotal movement of the viewer about an axis perpendicular to the pivot axis at the first end of said second bracket, and

(c) slidably movable means for aligning the viewer with the face of the head of the club, the slidably movable means for aligning the viewer with the face of the head of the club comprises a pair of gauge pins mounted for slidable movement on the viewer.

4,116,449

AMUSEMENT DEVICE

Jeffrey D. Breslow, Highland Park, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

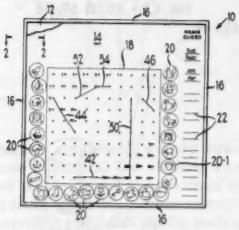
Filed Aug. 15, 1977, Ser. No. 824,350
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—240 **6 Claims**

1. An amusement device useful in art education comprising:

a game board having a playing surface with a plurality of identified, spaced apart, dots arranged in a grid system thereon, and a plurality of symbols thereon adapted to be roughly represented by lines drawn between selected ones of said dots in accordance with a program card corresponding to each of said symbols;

a transparent sheet over said playing surface for removably displaying lines drawn with marker means running be-

tween selected dots as directed sequentially by a program card; and



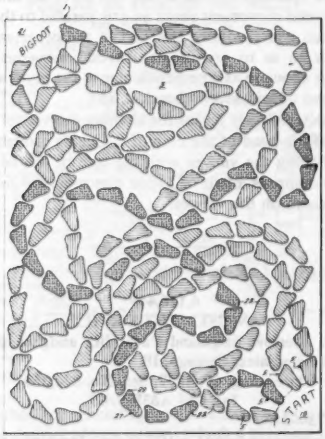
chance means for selecting the sequence of lines to be drawn from a program card representing one of said symbols.

4,116,450

BOARD GAME APPARATUS

Robert William Darrell, Fort Myers, Fla., assignor to Bigfoot Industries, Inc., Cape Coral, Fla.

Filed Dec. 27, 1976, Ser. No. 753,988
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—249 **4 Claims**



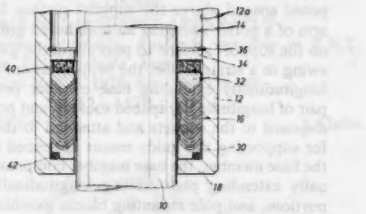
1. A game apparatus comprising,
a playing surface,
said playing surface having a plurality of trails,
each said trail having a plurality of spaces,
each said trail having a beginning point and an ending point,
each trail having an equal number of spaces between said beginning and end points of said trail,
each said trail having one movable playing piece which can only move along said trail,
random indicia selection means for determining number of spaces said playing piece may move down said trail,
said random indicia selection means including a deck of playing cards,
each said space having a foot print configuration,
each said space being aligned with its longitudinal axis substantially parallel with the center line of said trail,
at least one of said plurality of spaces of each said trail is aligned with its toes in reverse disposition relative to the balance of said plurality of spaces,
part of said cards having displayed thereon at least one left foot print,
part of said cards having displayed thereon at least one right foot print and said part being equal in number to said cards having displayed thereon a left foot print,
each said left foot print card having displayed thereon a left foot print card combination of player's identification and indicia equal to the number of spaces said playing piece may move,
each of said right foot print cards having displayed thereon a right foot print card combination of player's identification and indicia equal to the number of spaces said playing piece may move,
each said right foot print card combination of player's identification and indicia matching at least one said left foot print card combination of player's identification and indicia.

4,116,451

SHAFT SEAL ASSEMBLY AND SEAL RING THEREFOR

Jeddy D. Nixon, and Lawrence W. Matson, Jr., both of Houston, Tex., assignors to Maurer Engineering, Inc., Houston, Tex.

Filed Jun. 16, 1977, Ser. No. 807,243
Int. Cl.[2] F16J *15/00*; F16L *21/04*
U.S. Cl. 277—116 **6 Claims**

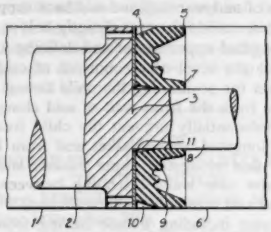


1. A seal for sealing the annular space between a rotating shaft and a housing comprising a plurality of seal rings that are V-shaped in cross-section with opposite convex and concave sides for stacking with the concave sides facing in the same direction, each seal ring including an annular body of self-lubricating, low-friction graphite having high thermal conductivity, said annular body being V-shaped in cross-section having outer and inner edges for moving into sealing engagement with a shaft and housing when subjected to a differential pressure and a ring of spring metal that is V-shaped in cross-section and embedded in the annular body of graphite to support the annular body of graphite in position to provide a seal between the shaft and the housing.

4,116,452
SLEEVE SEAL FOR MASTER CYLINDERS OF HYDRAULIC BRAKE SYSTEMS

Johannes Schanz, Bad Homburg, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Nov. 7, 1977, Ser. No. 848,839
Int. Cl.[2] F16J 9/00, 15/32
U.S. Cl. 277—205 1 Claim



1. A sleeve seal for master cylinders of hydraulic brake systems comprising:

cylindrical cylinder wall having a longitudinal axis;

a piston disposed in said cylinder wall coaxial of said axis, said piston having a front end and a given diameter;

a cylindrical piston extension disposed coaxial of said axia and connected to said front end of said piston, said piston extension having a diameter less than said given diameter; and

said sleeve seal including

a flat surface transverse of said axis resting against said front end of said piston adjacent the outer surface of said piston extension and the inner surface of said cylinder wall, said flat surface providing a space adjacent the inner surface of said cylinder wall and a space adjacent the outer surface of said piston extension,

an outer elongated, circular sealing lip extending from said flat surface resting against the inner surface of said cylinder wall,

an inner elongated, circular sealing lip extending from said flat surface resting against the outer surface of said piston extension, and

circular coaxial undulations disposed in the front surface of said sleeve seal spaced from said flat surface between said outer and inner sealing lips.

4,116,453
MULTI-PART PRESSURE CHUCK

Eugene R. Andre, 26405 Hendrie, Huntingdon Woods, Mich. 48070

Filed May 2, 1977, Ser. No. 793,129
Int. Cl.[2] B23B 5/22
U.S. Cl. 279—4 7 Claims

1. A work clamp comprising:

(a) a support body to lie adjacent a work part,

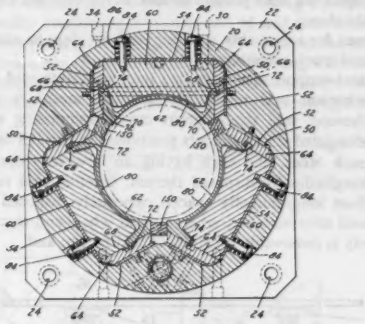
(b) a plurality of pressure pads movably disposed in said body,

(c) means to mechanically move said pads to a position contacting a work part and to hold said pads in said position,

(d) a flexible pressure actuated wall between said pad and said work part having a fluid chamber to receive pressure to urge said wall into holding contact with said part,

(e) the support body having a plurality of open-topped rectangular recesses disposed about a common axis, each recess having side walls and a base to serve as a slide surface,

(f) said pressure pads being disposed singularly in said recesses and having side surfaces to cooperate with said side slide surfaces of said recesses, and

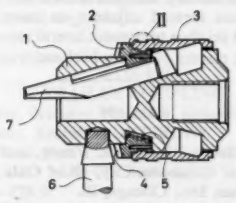


(g) means to bias said pressure pads toward the base of each respective recess.

4,116,454
CHUCK FOR HAMMERDRILLS AND THE LIKE

Albrecht Schnizler, Jr., Nürtingen, and Klaus Bartmann, Neuffen-Kappishäusern, both of Fed. Rep. of Germany, assignors to Metabowerke KG Closs Rauch & Schnizler, Nürtingen, Fed. Rep. of Germany

Filed Mar. 25, 1977, Ser. No. 781,445
Claims priority, application Fed. Rep. of Germany, Apr. 1, 1976, 2614030
Int. Cl.[2] B23B 5/22
U.S. Cl. 279—62 14 Claims



1. A chuck for hammerdrills and the like, comprising in combination, a chuck body; a plurality of jaws on said chuck body for engaging and holding a tool bit; and means connected to said jaws for adjusting the engagement of said jaws with the tool bit, said means comprising a guide sleeve having a main portion with an outer and inner surface, said main portion defining a central axis therethrough, a toothed gear encircled by said sleeve and having a circumferentially extending groove facing the inner surface of said sleeve, said groove having a bottom which is at least partially roughened, said sleeve including at least one inwardly offset locking portion having an outer and inner surface which are inwardly offset with respect to the main portion of said sleeve, said inwardly offset portion projecting into said groove and engaging the roughened bottom of said groove.

4,116,455
SKATEBOARD SKI

Donald R. Dotson, 1837 Wallace Ave., Costa Mesa, Calif. 92627, and Ronald R. Smith, 318 E. Berkeley St., Santa Ana, Calif. 92707

Filed Mar. 7, 1977, Ser. No. 775,290
Int. Cl.[2] A63C 17/18
U.S. Cl. 280—7.12 2 Claims

1. A skateboard ski adapted to be mounted to a skateboard

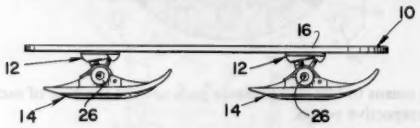
having a wheel-and-truck assembly, wherein said skateboard ski comprises:

a ski shoe having a substantially flat, elongated mid-section;

an upturned nose portion formed at the forward end of said ski shoe;

means for removably securing said ski shoe to said wheel-and-truck assembly;

a strut-support means formed integrally with said ski shoe, whereon said removable securing means is mounted thereon, said strut-support means comprising a pair of elongated strut members positioned in parallel relation to each other, and each having an upwardly open recess longitudinally disposed therein, wherein said recess defines longitudinally spaced oppositely disposed sides in said strut member, whereby said wheel-and-truck assembly is removably received in said recess; and



wherein said removably securing means comprises keeper means, said keeper means comprising an elongated strap member mounted to said strut member on one side of said recess, and a latch mounted to said strut member on the opposite side of said recess to receive said strap member, said recess being formed to receive the wheels of said truck assembly therein;

runners integrally formed on the under surface of said ski shoes;

kick-up means formed at the rearward end thereof, to prevent drag and binding with the snow;

restraining means formed adjacent an inner side of said recess on said ski shoe to prevent lateral movement of said ski shoe with respect to said wheel-and-truck assembly

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4,116,456

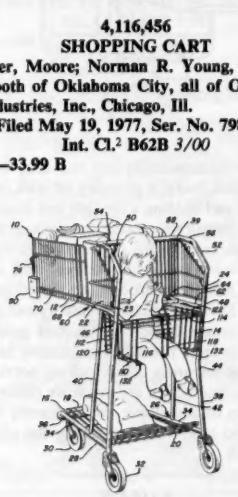
SHOPPING CART

Don A. Stover, Moore; Norman R. Young, and Glenmore J. Runnion, both of Oklahoma City, all of Okla., assignors to Unarco Industries, Inc., Chicago, Ill.

Filed May 19, 1977, Ser. No. 798,295

Int. Cl.[2] B62B *3/00*

U.S. Cl. 280—33.99 B **13 Claims**



1. A shopping cart, comprising:

an elongated upper basket having a bottom for carrying groceries and the like, a pair of spaced elongated side walls extending upwardly from said bottom at a height sufficient to retain said groceries in said upper basket without the use of a supporting removable basket thereon, and a pair of spaced upright end walls including a front wall and a stationary rear wall extending between said side walls;

a baby basket spaced away from the interior of said elongated upper basket and including a seat positioned below the level of the bottom of said elongated upper basket for carrying a child so that the child's center of gravity is substantially below the level of the bottom of said elongated upper basket, a stationary back support extending upwardly from said seat, a crotch-like end wall spaced rearwardly of said rear wall and said back support so as to be positioned outside the area directly below the bottom of said elongated upper basket and defining a pair of leg holes below the level of the bottom of said elongated upper basket for positioning the child facing away from and remote from the front wall of said elongated upper basket to substantially prevent the child from reaching into said elongated upper basket and from kicking the bottom of said elongated upper basket, and a pair of spaced lower side walls extending between said back support and said crotch-like end wall; and

a support frame including a base having front and rear wheels, post-like support means extending upwardly from said base including baby-basket support means for securely engaging said lower side walls at locations adjacent said crotch-like end wall and said stationary back support to securely carry and support said baby basket, upper basket support means cantilevered from said post-like support means for supporting said elongated upper basket, and means fixedly connecting portions of said elongated upper basket to said upper basket support means for substantially preventing removal of said elongated upper basket.

4,116,457

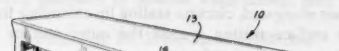
STEP ASSEMBLY FOR VEHICLE

Marvin E. Nerem, 136 E. M St., Forest City, Iowa 50436, and Roger W. Denney, 1035 Allen, Garner, Iowa 50438

Filed Aug. 31, 1977, Ser. No. 829,235

Int. Cl.[2] B60R *3/02*

U.S. Cl. 280—166 **29 Claims**



1. A step assembly for a vehicle having a doorway and support beams below the doorway comprising: a frame having a pair of parallel side members and a rear member secured to the side members, said frame adapted to be secured to the support beams below the doorway of the vehicle, a step unit selectively movable between an out step position below and outwardly of the doorway and an in storage position below the frame, first and second pairs of links pivotally connecting the step unit to the frame, each link having an upper end and a lower end, first pivot means connecting the upper end of one link of the first pair of links to one side member, a second pivot means connecting the upper end of one link of the second pair of links to the other side member, a transverse rod nonrotatably secured to the upper ends of the other links of the first and second pairs of links, said rod having opposite ends rotatably mounted on the side members; said step unit having a pair of horizontal side members, and a transverse horizontal platform secured to said side members; pivot means pivotally connect-

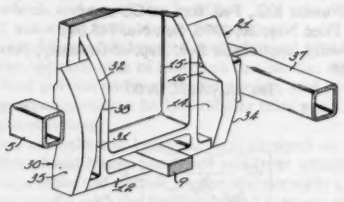
ing the lower ends of the first pair of links to one side member and pivotally connecting the lower ends of the second pair of links to the other side member, a power unit pivotally connected to the rear member of the frame, said power unit having a reversible electric motor, a lead screw drivably connected to the motor, a nut threaded on the screw, crank means secured to the rod, and means pivotally connecting the nut to the crank means whereby when said motor is operated in a first direction of screw rotates to move the nut so that the crank means rotates the rod thereby moving the step unit from an out step position to an in storage position and when said motor is operated in a second direction the screw moves the nut to rotate the rod in an opposite direction to move the step from the storage position to the out step position.

4,116,458

REVERSIBLE SWAY LIMITING BLOCKS FOR A TRACTOR HITCH

David A. Berg, Milwaukee, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 21, 1977, Ser. No. 853,090
Int. Cl.[2] A01B *59/043*
U.S. Cl. 280—474 **10 Claims**



1. A sway limiting device on a tractor having laterally spaced lower draft arms universally connected to the tractor for vertical and lateral swinging movement comprising, a tractor chassis, a sway limiting support means mounted on said chassis between said draft arms, a sway limiting block mounted on each of the laterally outward sides of said sway limiting support means, each of said sway limiting blocks defining a single bearing surface on one side and two vertically spaced bearing surfaces connected by an adjoining inclined surface on the other side, means selectively fastening a sway limiting block on each side of said support means with the single surface outwardly to restrict lateral swaying of the draft arms throughout the height of the blocks and selectively fastening one of the blocks on each of the sides of the support means with the two vertically spaced bearing surfaces outwardly to permit swaying of the draft arms in the lowered position and restrict swaying in the raised position to thereby provide interchangeable positioning of the blocks from side to side without any rotational movement of the blocks for utilizing the lateral surfaces of the sway blocks to control the swaying movement of the lower draft arms.

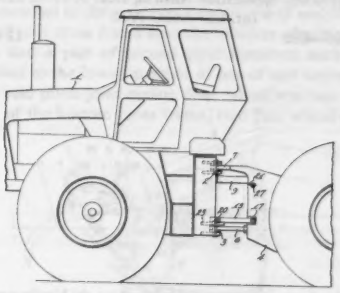
4,116,459

SAFETY LOCK FOR ARTICULATED JOINT ON VEHICLE

Ernest A. Kreitzberg, Mukwonago, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 30, 1976, Ser. No. 755,933
Int. Cl.[2] B62D *53/00*
U.S. Cl. 280—474 **9 Claims**

1. An articulating vehicle having a locking link for locking an articulating joint of the vehicle comprising, a bogie of an articulating vehicle, another bogie of the articulating vehicle, at least one articulating joint pivotally connecting said bogies of said vehicle, including an upper and a lower vertically aligned articulated bearings defining an articulating axis with one of said bearings pivotally connecting said bogies, an articulating link connected to the other of said bearings with a third bearing defining another articulating axis pivotally connecting said bogies, at least two of said bearings defining spherical bearings, a locking link, a pivotal joint defining a horizontal axis pivotally connecting a pivotal end of said link to one of said bogies of said articulating vehicle, a swingable end on said locking link defining a hole, a pin support defining a horizontal opening mounted on said one bogie of said vehicle for receiving the swingable end of said locking link for defining the rest



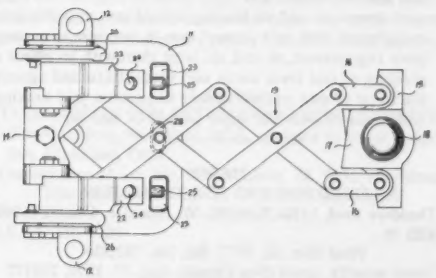
position of said locking link, a pin for reception in said hole in said locking link and the opening of said pin support in the rest position, a pin mounting means defining a horizontal pin opening mounted on the other of said bogies of said vehicle for selectively receiving said swingable end of said locking link, said pin selectively received in said pin mounting means and said swingable end of said locking link when said locking link is in the locking position to thereby lock said pin and said locking link when said locking link is in the locking position for locking said articulating joint.

4,116,460

TRAILER COUPLING

Wilfred Drower, Brisbane, Australia, assignor to Litecraft Pty. Ltd., Brisbane, Australia

Filed Nov. 1, 1976, Ser. No. 737,687
Int. Cl.[2] B60D *1/00*
U.S. Cl. 280—478 R **2 Claims**



1. A trailer coupling comprising a housing, an extensible lazy tongs linkage, one end of which is pivotally mounted on the housing for rotation about a substantially vertical axis, a plate for carrying a trailer coupling element mounted on the other end of said extensible linkage and centering means connected to the linkage and mounted thereon for engaging the plate so that the linkage is substantially self centering when retracting, wherein side guides are provided on said plate, which guides force the linkage to an angular position in which it moves directly without skew to the retracted position, and means for locking said extensible linkage to the housing when in the fully

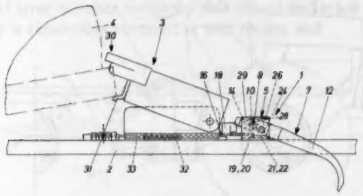
retracted position whereby substantially the whole of the load is borne by the housing.

4,116,461

BRAKE DEVICE FOR SKIS

Erwin Krob, Vienna, and Josef Svoboda, Schwechat, both of Austria, assignors to TMC Corporation, Baar,Zug, Switzerland

Filed Nov. 24, 1976, Ser. No. 744,939
Claims priority, application Austria, Dec. 5, 1975, 9252/75
Int. Cl.[2] A63C 7/10
U.S. Cl. 280—605 **11 Claims**



1. A brake device for use on skis having a ski binding component mounted for movement relative to said ski in response to both an engagement with and release from a ski boot, comprising:

at least one lever and pivotal support means pivotally supporting said lever on said ski for movement about a horizontal axis and a vertical axis between a braking position and a retracted position, said lever having two arms, one arm defining a braking wing and the other arm defining a control arm for controlling the movement of said lever about said vertical axis, said lever also having a cam surface thereon;

resilient means continuously urging said lever toward said braking position about both said horizontal and vertical axes whereat said braking wing of said lever extends below the bottom surface of said ski;

first means on said ski binding component movable into engagement with said cam surface in response to an initial engagement of said ski boot therewith to effect a pivoting of said lever about said horizontal axis from said braking position to said retracted position and against the force of said resilient means; and

second means on said ski binding component movable into engagement with said control arm in response to a complete engagement of said ski boot therewith to effect a pivoting of said lever about said vertical axis and against the force of said resilient means to position said braking wing entirely over the upper surface of said ski.

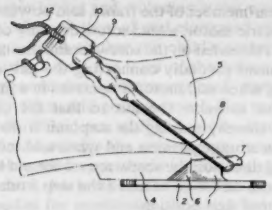
4,116,462

HEEL BINDING FOR TRAIL SKIS

G. Theodore Buel, 1179a King St., W., Toronto, Canada (M6K 3C5)

Filed Mar. 31, 1977, Ser. No. 783,334
Claims priority, application Canada, Apr. 27, 1976, 251177
Int. Cl.[2] A63C 9/12
U.S. Cl. 280—614 **7 Claims**

1. In a trail ski including a toe binding, a heel binding for use in combination with a ski boot, said heel binding comprising an elongated elastic member attached at each end thereof to said ski boot to form a closed loop, heel locating means including a flat base attached to the upper surface of the ski adjacent the heel of said ski boot, a shaped portion extending from one end of said base and a hook extending from the other end of said base, said shaped portion and hook being integral and forming a single member perpendicular to said base and integral therewith, a notch in said ski boot heel cooperating with said shaped portion to locate said boot on said ski in alignment with said toe binding, said hook releasably receiving said elastic member



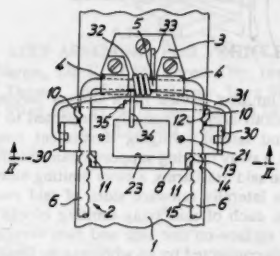
so as to maintain said elastic member under sufficient tension to resiliently retain the heel of the ski boot in contact with the ski.

4,116,463

SKI BINDING

Reinhold Zoor, Dachau, Fed. Rep. of Germany, assignor to Heinrich Wunder KG., Fed. Rep. of Germany

Filed Nov. 26, 1976, Ser. No. 745,041
Claims priority, application Fed. Rep. of Germany, Nov. 29, 1975, 2553885
Int. Cl.[2] A63C 9/00
U.S. Cl. 280—615 **18 Claims**



1. In a ski binding, a combination comprising a frame including a front portion and a plurality of elongated frame members extending rearwardly from said front portion, as considered in the skiing direction, at least one of said frame members having a plurality of first detent means spaced apart from each other, as considered longitudinally of said one frame member; means for coupling said front portion to a ski so as to enable said frame to pivot about an axis extending transversely of the skiing direction; means for reinforcing said frame, including a first section located below said frame members, a second section located above said frame members and at least partially overlying said first section, and means for fastening said sections to each other, said second section having an upper side which is contacted by the sole of a boot that is secured to the ski by said binding and at least one of said sections having second detent means releasably engaging selected first detent means of said one frame member to normally hold said one section against any movement lengthwise of said one frame member, said reinforcing means being movable lengthwise of said frame members solely upon disengagement of said first and second detent means from each other; and means for connecting said reinforcing means to the foremost portion of the sole of a boot which is secured to the ski, including a sole-engaging yoke and bearings provided on one of said sections and defining for said yoke a pivot axis extending transversely of the skiing direction.

4,116,464

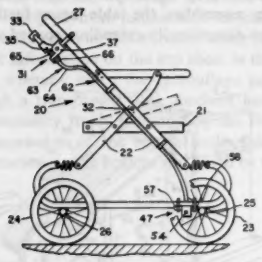
AUTOMATIC BRAKE FOR WHEELED CARRIAGES

Frederick J. Haley, 819 Stevens St., Lowell, Mass. 01851

Division of Ser. No. 718,539, Aug. 30, 1976. This application Jul. 5, 1977, Ser. No. 813,006

Int. Cl. B62b *3/02*

U.S. Cl. 280—647 6 Claims



1. In combination

a collapsible, foldable, baby stroller having a skeletonized foldable frame, a front and rear axle, spoked front and rear wheels and a push bar handle;

and automatic brake means comprising:

a pair of finger bar brackets each clamped proximate one of the opposite ends of said push bar handle, each having a fixed portion and a pivotable portion, said pivotable portions supporting a hollow tubular telescopable finger bar therebetween;

a pair of brake rod brackets, each clamped on an opposite side of said frame, proximate said front wheels, each having a brake rod slidable therein and normally spring biased outwardly with the free tip thereof between the spokes of one of said front wheels and each brake rod having a set screw slide mounted thereon;

and a sheathed flexible stranded cable connecting each finger bar bracket to one of said brake rod brackets, each stranded cable connecting the pivotable portion of a finger bar bracket to the set screw slide of a brake rod and one end of each sheath of each said cable being affixed to the fixed portion of a finger bar bracket and the other end of each said sheath being affixed to the corresponding brake rod bracket.

4,116,465

BABY CARRIAGES

Owen F. Maclaren, Barby, near Rugby, England, assignor to Gannet Holdings Limited, Channel Islands

Filed Oct. 29, 1976, Ser. No. 737,011

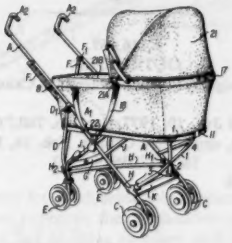
Claims priority, application United Kingdom, Nov. 3, 1975, 973092/75; Nov. 18, 1975, 47452/75

The portion of the term of this patent subsequent to Nov. 29, 1991, has been disclaimed.

Int. Cl. B62b *11/00*

U.S. Cl. 280—647 20 Claims

1. A carriage, stroller, wheeled-chair, cart or like assembly which has a rigid three-dimensional structure when unfolded, and is capable of simultaneously folding in a plurality of its three dimensions to form a substantially stick-like bundle in its folded condition, said assembly comprising: a bottom cross frame of rigid members interpivoted at a point between their ends; a back cross frame of rigid members interpivoted at a point between their ends; pivot joint means interpivotally attaching one of the bottom frame members to one of the back frame members at each of two corners of said cross frames, said pivot joint means for permitting the members of each cross frame to pivot with respect to each other and for permitting said cross frames as a whole to pivot with respect to each other; two foldable brace members each comprising pivotally connected upper and lower members, one on each side of the assembly, pivotally attached to the bottom cross frame near the two other corners of the bottom cross frame, respectively, and to the back cross frame near the other two corners of the back cross frame, respectively; first releasable means for holding the members of at least one of the cross frames in an extended position when the assembly is unfolded; and second releasable means for holding said brace members in an extended position when the assembly is unfolded and for linking the folding actions of the foldable brace members and cross frames so that those folding actions occur simultaneously, said second releasable means comprising a pair of first strut members each pivotally connected to the upper member of one of said brace members and to a cross frame near the location of said pivot joint means, and a pair of second strut members each pivotally connected to the lower member of one of said brace members and to said pivot joint means; four wheel sets one near each corner of the bottom cross frame, two rear wheel sets being



mounted on downwardly extended portions of said second strut members, and two front wheel sets being mounted on slightly extended ends of the foldable brace members; a third cross frame of rigid members interpivoted at a point between their ends with one end of one of the rigid members of said third cross frame being pivotally attached to one foldable brace member near one of said other corners of the bottom cross frame, and the other of said rigid members of said third cross frame being attached to the other foldable brace member near another of the other two corners of the bottom cross frame, said third cross frame simultaneously foldable with the remainder of the assembly, and pivotally extendable from a position substantially parallel the plane of the bottom cross frame to a position extending generally upwardly from said other two corners of the bottom cross frame in which position of said third cross frame comprises means for supporting the forward end of any carrying means mounted on the assembly.

4,116,466

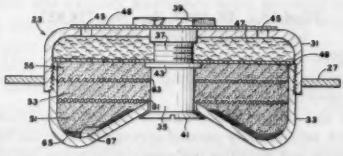
FLUID SUPPLY FOR OCCUPANT RESTRAINT SYSTEM

Robert G. Gehrig, Southfield, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 528,247, Nov. 29, 1974, abandoned. This application Aug. 30, 1976, Ser. No. 718,737

Int. Cl.[2] B60R *21/08*

U.S. Cl. 280—736 19 Claims



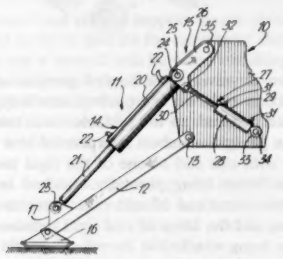
1. A fluid supply for inflating an expandable confinement of a vehicle occupant restraint system of the type activated in response to a vehicle collision signal, said fluid supply comprising:

(a) housing means defining a fluid discharge port for directing fluid flow from said housing means;
(b) gas generating means disposed within said housing means and including combustible means having
(i) a sustaining charge comprising a plurality of layers of granulated material, said sustaining charge being of the type which, upon combustion, produces solid, porous sinters and fly ash;
(ii) screen means disposed between adjacent layers of said sustaining charge, each of said screen means having a mesh substantially finer than the granules of material in the layer adjacent said screen means and upstream therefrom, each of said screen means permitting gas to pass freely therethrough and retaining said sinters upstream therefrom, said retained sinters being effective for permitting said generated gas to pass therethrough while simultaneously filtering said fly ash; and
(c) means operable to activate said sustaining charge in response to said collision signal.

4,116,467
OUTRIGGER

Russ J. Ewert, Calgary, Canada, assignor to Canadian Foremost Ltd., Canada

Filed Jan. 19, 1977, Ser. No. 760,715
Claims priority, application Canada, Feb. 16, 1976, 245819
Int. Cl.[2] B60S 9/10
U.S. Cl. 280—764 **6 Claims**



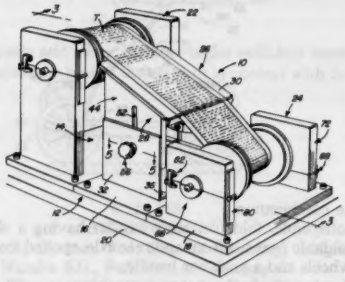
1. An outrigger for stabilizing the frame of a mobile apparatus, said outrigger comprising:
an outrigger arm consisting of a ground engaging outer end and a frame engaging inner end, the inner end being pivotally connected to the frame by way of pivotal means fixed relative to said frame;
a main hydraulic jack pivotally connected at the outer end thereof to said arm at a point outward of said inner end of the arm;
means connecting the inner end of said jack to the frame for forcing displacement to the inner end of the jack inwardly relative to the fixed pivot means and the frame.

4,116,468
REGISTER TAPE EDITOR

Hilda C. Marten, 13560 Ridge Rd., North Huntingdon, Pa. 15642

Filed Mar. 18, 1977, Ser. No. 778,937
Int. Cl.[2] B42D 19/00; B65H 17/02
U.S. Cl. 281—7 **12 Claims**

1. A register tape editor, comprising, in combination:
(a) a supporting base;
(b) first and second roller assemblies rotatably mounted in spaced, substantially parallel arrangement on the base; and
(c) reading and notation table means disposed between the first and second roller assemblies for supporting a length of tape extending between the roller assemblies, the latter winding and unwinding the tape from one of the roller assemblies to the other across the reading and notation table means, the reading and notation table means being adjustable vertically with respect to the supporting base of the editor, one of the first and second roller assemblies has an axis of rotation disposed vertically from the supporting base a greater distance than an axis of rotation of the other of the roller assemblies, with the reading and notation table means including a top portion forming an inclined tape support surface arrangeable substantially parallel to a plane assumed by the length of tape extending between the roller assemblies, the table means further including a pair of co-directionally extending, spaced stands arranged

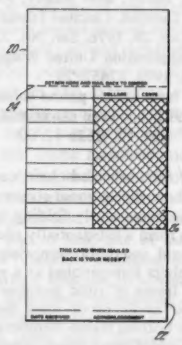


abutting with and fastened to the supporting base, with the stands being disposed extending upwardly, each of the stands being provided with an aperture, the top portion of the table means including two substantially parallel legs extending downwardly from the tape support surface, each of the legs being provided with a longitudinally extending slot cooperating with an aperture to form a pair of sets of apertures and slots, and fastener means engaging both sets of each of the cooperating apertures and slots for adjustably mounting the top portion of the top means on the stands.

4,116,469
COMBINED PAYMENT AND RECEIPT FORM AND METHOD OF USING

Russell H. Harriman, 30335 Woodhaven Ln., Birmingham, Mich. 48010, and Timothy T. May, 25 Crestwood, Gross Point Shores, Mich. 48236

Filed Aug. 8, 1977, Ser. No. 822,806
Int. Cl.[2] B42D 15/00
U.S. Cl. 282—23 R **6 Claims**



1. A combined payment and receipt form set for use in mailing a payment from a first party to a financial institution and acknowledgement thereof from the financial institution to the first party, said form set including a first top payment sheet and a second bottom receipt sheet, said top sheet having a preprinted payment information area adapted to be filled in by

the first party, said second bottom sheet being formed of card stock and being of a size and thickness suitable for mailing as a postcard, said bottom sheet having a preprinted background camouflage pattern area located on the surface facing said top sheet and located immediately below the preprinted payment information area, said camouflage pattern printed in a first predetermined color, the opposite surface of the bottom sheet having an address area and a postage area, said set including means for imprinting payment information on said camouflage pattern in a second predetermined color when the first party writes payment information on the top sheet in the preprinted payment area, whereby when the camouflage pattern area is viewed through a transparent filter medium having a color transmitting frequency freely transmitting the first color but restricting transmission of the second color, the imprinted payment information on the bottom sheet will be visible to the viewer.

4,116,470

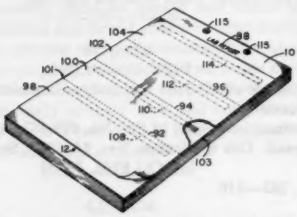
MEDICAL INFORMATION FORM FOR PLURALITY OF INDIVIDUAL REPORTS

Edward L. Johnsen, 12 Fox Meadow Ln., Wayland, Mass. 01778

Continuation of Ser. No. 613,546, Sep. 15, 1975, abandoned, which is a division of Ser. No. 382,162, Jul. 24, 1973, Pat. No. 3,945,879. This application Jan. 31, 1977, Ser. No. 767,945

Int. Cl.[2] B42D *11/00;* **G09F** *1/10*

U.S. Cl. 283—66 A **1 Claim**



1. A medical information form comprising a base or carrier sheet and one or more reports which are selectively secured thereto, said base or carrier sheet having a particular pattern of pressure sensitive adhesive on one surface thereof, which subdivides said surface into areas which are free of adhesive, and wherein said pattern comprises an elongate, transversely extending strip co-extensive with the width of the base or carrier sheet, and a release sheet secured to, carried by, and overlying the said base or carrier sheet and the adhesively coated surface thereof, said release sheet longitudinally subdivided into a plurality of interconnected, independently removable sub-panels each of which overlies an adhesive strip and an area of the base or carrier sheet which is to be occupied by a single report upon removal of a sub-panel whereby to secure one report to the particular adhesive pattern which is exposed incident to the removal of a sub-panel of the release sheet, and wherein each report is not only secured to the base or carrier sheet but also to a portion of an adjacent report when mounted on the information form, said portion of the adjacent report including a coating of pressure sensitive adhesive and a strip of removable release sheet secured to, carried by, and concealing said adhesive coating.

4,116,471

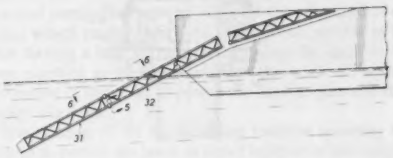
QUICK OPERATING CONNECTOR FOR PIPES OR THE LIKE

Anthony Bruce Duncan, Missouri City, and Arthur H. T. Chin, Houston, both of Tex., assignors to HydroTech International, Inc., Houston, Tex.

Filed Apr. 25, 1977, Ser. No. 790,315

Int. Cl.[2] F16L *35/00*

U.S. Cl. 285—1 **11 Claims**



1. In apparatus for quick releasably connecting a first structure to a second structure, the combination comprising:

a plurality of first coupling members each connected at one end thereof to said first structure, and each having at the other end thereof an annular radially outwardly extending flange having a forward side and a rearward side, said rearward side having a radially inner portion and a radially outer portion, said radially inner portion having a slope relative to the central axis of said first coupling member greater than that of said radially outer portion;

a plurality of second coupling members, each connected at one end thereof to said second structure, and each having at the other end thereof a housing for receiving said flange in mating fashion;

a plurality of self-locking cams disposed circumferentially about each of said housings, said self-locking cams being generally radially inwardly and outwardly movable between a retracted position in which said flange is receivable within said housing and an extended position in which said self-locking cams engage said radially inner portion of said flange in self-locking fashion;

means for actuating said self-locking cams to and from said extended position;

a plurality of non-locking cams disposed circumferentially about each of said housings, said non-locking cams being generally radially movable between a retracted position and an extended position in which said non-locking cams engage said radially outer portion of said flange in non-locking fashion;

a plurality of hydrualic piston and cylinder assemblies disposed circumferentially about each of said housings, said piston and cylinder assemblies being arranged for actuating said non-locking cams to said extended position and holding said non-locking cams in engagement with said radially outer portion of said rearward side of said flange to thereby hold said first and second coupling members together when said self-locking cams are actuated to said retracted position;

and means for substantially simultaneously actuating all of said piston and cylinder assemblies so as to move said non-locking cams on all of said housings to said retracted positions after said self-locking cams have been actuated to said retracted position, to thereby quickly disconnect said first structure from said second structure.

4,116,472

SEALED WALL LEAD-THROUGH MEANS FOR CABLES IN PARTICULAR FOR JUNCTION BOXES

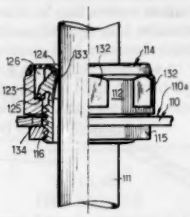
Ludwig Peter Schmitt, 67260 Sarre-Union, France

Filed Apr. 22, 1975, Ser. No. 571,018

Claims priority, application France, Apr. 25, 1974, 74 14476; Apr. 15, 1975, 75 11670

Int. Cl.² F16L *35/00*

U.S. Cl. 285—4 **7 Claims**



1. In a fluid-tight wall lead-through packing and gland assembly for cables more particularly for the connection of electric cables within a hole in a wall of a junction box, comprising a bushing having a threaded portion securable within said hole and advanceable axially therewithin, said bushing terminating at one of its axial ends in circumferentially spaced and axially extending teeth radially tiltable with respect to said threaded portion, each of said teeth forming a lever one free end of which projects radially outwardly of the surface of said bushing, an annular collar adapted to axially abut the wall and positionable coaxially and externally of and about said one axial end of said bushing and comprising circumferentially spaced longitudinal cuts provided on a portion of the inner surface of said collar, said cuts being positioned and dimensioned to receive corresponding teeth of said bushing, one end of each said cut forming an abutment for bearing engagement by the free end of the corresponding tooth of said bushing, and an annular deformable sealing packing positionable concentrically about said cable and having a medial portion entering said one axial end of said bushing and a radially outer portion engaging with said annular collar; thereby said teeth are radially inwardly pivotable upon engagement of said teeth with said abutment and engagement of said collar with the wall in response to axial advancement of said bushing into the hole so as to deform said sealing packing into sealing engagement with the outer surface of the cable.

4,116,473

PIPE COUPLING

José Humet Creus, Avenida Mosen Jacinto Verdiguer, 15 Santa Perpetua de Moguda, Barcelona, Spain

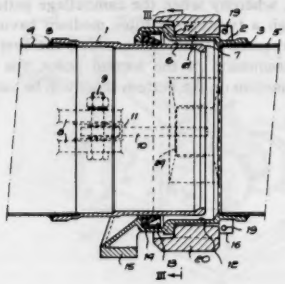
Filed Nov. 3, 1976, Ser. No. 738,465

Claims priority, application Spain, Nov. 4, 1975, 216.609

Int. Cl.² F16L *39/04*

U.S. Cl. 285—5 **10 Claims**

1. A pipe coupling for fluid carrying pipes comprising male and female coupling element respectively terminating in open ends, said male coupling element extending with clearance into said female coupling element so that the latter has an inner surface surrounding and spaced from an outer surface of said male coupling element and defining with said outer surface an annular gap, sealing means operatively connected with said elements for fluid-tightly sealing said gap while providing for tilting of said elements, one relative to the other, within the limits of the clearance therebetween, and attachment means operatively connected with said elements for releasably attaching them to each other, said attachment means including a ring loosely surrounding one of said coupling elements, a pair of diametrically opposed articulation means operatively connected between said ring and said one element for connecting said ring to said one element for swinging movement with respect thereto about a first swing axis extending through said pair of articulation means and perpendicularly across a central axis of said one coupling element, said attachment means further including two pairs of engagement means, one of said pairs of engagement means being diametrically opposed to each other and situated at said ring along a second swing axis which is perpendicular to said first swing axis and said central



axis of said one coupling element, both of said swing axes being situated in a plane normal to said central axis of said one coupling element, and the other of said pairs of engagement means being carried by the other of said coupling elements respectively in axial alignment with said one pair of engagement means and respectively engaging said one pair of engagement means for swingably connecting said coupling elements to each other for swinging movement one relative to the other about said second swing axis, whereby said male and female coupling elements are free to undergo a universal relative angular movement when attached together.

4,116,474

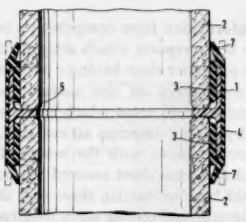
PIPE COUPLING

Franz-Josef Wolf, D-6483 Bad Soden-Salmunster, Sprudelallee 19, Germany

Continuation-in-part of Ser. No. 675,457, Apr. 9, 1976, abandoned. This application Nov. 14, 1977, Ser. No. 851,591

Int. Cl.² F16L *49/00*

U.S. Cl. 285—110 **7 Claims**



1. In a pipe coupling for connecting to one another the ends of two pipes made of mineral materials which includes an insertion socket in the form of a cylindrical body open at both ends and having an outside diameter larger than the diameter of either pipe and a packing ring in the form of a resilient, extensible cylindrical member having a central portion and two end portions, the central portion extending over the outer wall of said body and the end portions projecting beyond the open ends of the cylindrical body, at least one sealing ring on each of the end portions of the member forming the packing ring, the improvement comprising the packing ring being

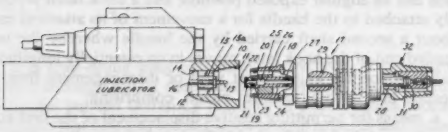
formed as the outer casing for the insertion socket, and the sealing rings on the end portions extending radially of the central portion beyond the ends of the insertion socket and having no contact with the inner wall of said body prior to insertion of a pipe end into the coupling and being disposed between the insertion socket in contact with said inner wall and the outer wall of the pipe during and after insertion.

4,116,475

DIRECT CONNECTION CO-AXIAL FITTING FOR INJECTION LUBRICATOR

Marshall H. Glaser, Birmingham, and Patrick L. Jenkie, Sterling Heights, both of Mich., assignors to Orsco, Inc., Troy, Mich.

Filed Oct. 8, 1976, Ser. No. 730,968
Int. Cl.[2] F16L *39/00*
U.S. Cl. 285—133 R **13 Claims**



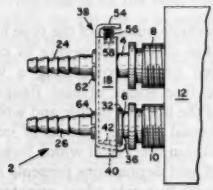
1. A co-axial direct connection fitting for dual fluid passage coupling with an Injection Lubricator, said Lubricator having means rigidly associating co-axial external air and internal lubricating fluid outlets, said external outlet including a threaded coupling element, said internal outlet terminating in a rigid relatively small diameter centrally located tubular coupling element, said fitting being characterized by means rigidly associaing co-axial external air and internal lubricating fluid inlets, said external inlet having means for sealed coupling with said external outlet including a threaded coupling element adapted to co-axially matingly engage said outlet threaded element upon rotation and thread produced axial displacement relative thereto, and said internal lubricating fluid inlet having means for sealed coupling with said internal outlet including a centrally located resiliant grommet adapted to directly align, overpass and sealingly connect with said outlet tubular element as a direct result of said co-axial mating engagement and thread produced axial displacement.

4,116,476

QUICK DISCONNECT COUPLER ASSEMBLY

Gary K. Porter, and George K. Porter, Jr., both c/o Porter Instrument Company, Inc., P.O. Box 326, Township Line Rd., Hatfield, Pa. 19440

Filed Nov. 11, 1977, Ser. No. 850,550
Int. Cl.[2] F16L *39/00*
U.S. Cl. 285—137 R **1 Claim**



1. The improvement in a coupler assembly for supplying different fluids having a base member adapted to supply fluid through a first socket member and a second different fluid through a second spaced socket member, each socket member being secured to the base and extending beyond the base, the improvement comprising:

a hose terminal fitting having a pair of spaced tubular plugs for entry into said socket members and each communicating with a hose nipple,

a hook secured to one of said socket members exterior of the base member and extending substantially perpendicular to the axis of the socket members,

a latch mounted on the hose terminal fitting substantially perpendicular to the axes of the nipples for engaging the hook and locking the tubular plugs against withdrawal from the sockets,

said latch having a first portion which extends along a rear face of the fitting and is connected to an operating finger adjacent one end of the fitting and which is connected to a second portion of the latch adjacent the other end of the fitting which engages the hook, said second portion of the latch having a cam surface for camming the latch to the open position as the latch engages the hook on inward movement of the plugs to permit the latch to pass and then engage the hook,

said first portion of the latch having recesses spanning the nipples to permit the latch to move relative to the nipples,

a compression spring engaging the finger to bias the latch to the closed position,

flanges on the fitting to guide the latch, and

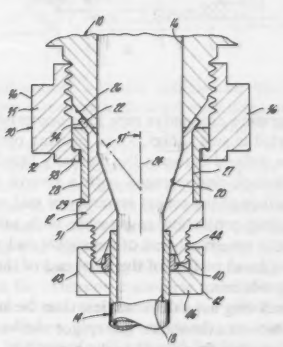
one of the plugs having a diameter larger than the diameter of the other plug and adapted to be received into the first socket member which has a diameter larger than the second socket member.

4,116,477

CONNECTOR, REDUCER/ADAPTER, FLARE TO FLARELESS

Ernest C. Wahoski, Harper Woods, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 14, 1977, Ser. No. 759,299
Int. Cl.[2] F16L *55/00*
U.S. Cl. 285—169 **3 Claims**



1. In the combination comprising an externally threaded pipe (**10**) defining a large diameter fluid passage (**16**), said pipe having an external frusto-conical end surface (**26**); and a smooth-walled tube **14** having a cylindrical end section defining an internal passage (**18**) of appreciably smaller diameter than the aforementioned fluid passage (**16**);

the improvement comprising means for connecting the tube to the pipe in fluid-tight fashion, said connecting means including a one-piece annular connector body (**12**) having a first end section that defines a large diameter passage constituting a smooth continuation of the aforementioned passage (**16**), a second end section defining a small diameter passage constituting a smooth continuation of the aforementioned smaller passage (**18**), and an intermediate

section defining a tapering passage merging smoothly with the large and small diameter passages;

the first end section of the connector body including an annular flange (22) angled acutely outwardly relative to the connector body axis to define an internal frusto-conical surface (33) matable with the frusto-conical end surface (26) on the pipe, said annular flange also defining an external frusto-conical surface (34);

means pressuring the connector body flange (22) against the pipe end surface, comprising a sleeve (28) encircling the connector body and a sleeve-engaged nut (30) threaded onto the pipe to draw the sleeve and connector body toward the pipe end surface;

said second end section of the connector body having a cylindrical socket therein snugly fitting around the cylindrical end section of the aforementioned tube (14), the mouth of the cylindrical socket being flared to define an annular cavity surrounding the tube;

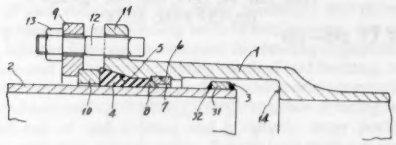
a sealing ring (40) seated within said cavity, and an annular cap (48) threaded onto the second end section of the connector body to compressively pack the sealing ring into the annular cavity.

4,116,478

SEPARATION-PREVENTIVE PIPE JOINT

Tadao Yamaji; Toshi Nakajima, and Takao Sagara, all of Amagasaki, Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Sep. 1, 1977, Ser. No. 829,605
Claims priority, application Japan, Sep. 13, 1976, 51-110112
Int. Cl.[2] F16L *21/04*
U.S. Cl. 285—302 **8 Claims**



1. In a separation-preventive pipe joint comprising a socket, a spigot inserted in said socket, a seal packing pressed into an annular space defined between the mutually fitted socket and spigot, a split lock ring engaged with a groove in the inner peripheral surface of the socket inwardly of said seal packing, and an engaging projection engageable with said lock ring axially from the innermost part of the socket and provided on the outer peripheral surface of the front end of the spigot, the improvement wherein:

said split lock ring has a thickness less than the annular space defined between the socket and spigot and has a diametrically expanding force, and said groove has a depth less than the thickness of said split lock ring whereby said split lock ring is adapted to be inserted through said annular space into seating engagement with said groove, a portion of said split lock ring projecting from said groove in clearance relation with the outer peripheral surface of the spigot for engagement with said engaging projection;

a back-up ring is interposed between said split lock ring and said seal packing, said back-up ring having opposite lateral surfaces abutting said split lock ring and said seal packing; and,

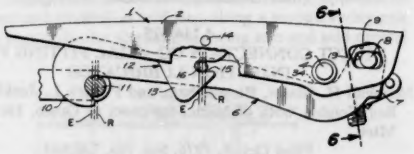
the abutting surfaces of said split lock ring and said back-up ring taper toward the front end of the spigot for retaining said split lock ring in seated engagement with said groove.

4,116,479

ADJUSTABLE FLUSH MOUNTED HOOK LATCH

L. Richard Poe, Long Beach, Calif., assignor to Hartwell Corporation, Placentia, Calif.

Filed Jan. 17, 1977, Ser. No. 759,752
Int. Cl.[2] E05C *5/00, 19/12*
U.S. Cl. 292—113 **7 Claims**



1. The combination with a latch structure including a manually pivotable handle about a first shaft between a closed position and an angular exposed position; and a hook latch pivotably attached to the handle for a movement of its attached end about a second shaft carried by the handle whereby the extended end of the hook latch moves in an essentially longitudinal direction for engagement with or disengagement from a keeper, of a latch adjustment means, comprising:

a. means for permitting relative displacement of the first and second shafts while the shafts remain in parallel relation;

b. screwthreaded means extending between the shafts to effect such relative displacement thereby to change the stress exerted between the hook latch and its keeper;

c. the screwthreaded means including a screw member extending between the shafts, a screwthreaded anchor bar engaging one side of the two shafts, and a wedge member exerting a spreading force between the shafts;

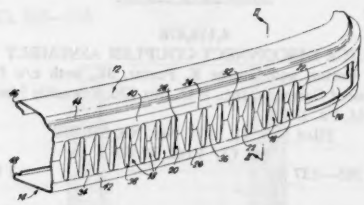
d. and an aperture in the handle providing access to the screwthreaded means while the hook latch and keeper are engaged.

4,116,480

AUTOMOTIVE VEHICLE BUMPER

Giovanni Crestetto, Turin, Italy, assignor to ITT Industries, Inc., New York, N.Y.

Filed Mar. 11, 1976, Ser. No. 666,100
Claims priority, application Italy, Mar. 21, 1975, 67714 A/75
Int. Cl.[2] B60R *19/02*
U.S. Cl. 293—98 **8 Claims**

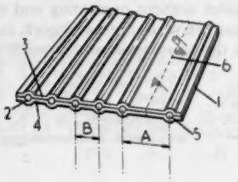


1. An automotive vehicle bumper of the type having a single shaped element of thin sheet steel having in cross-section a substantially C-shaped profile comprising a web and two flanges, wherein the free edges of said flanges are turned toward the interior of the bumper profile and wherein said web presents from its external surface a series of integral depressions drawn from said thin sheet steel which form a plurality of ribs, wherein each of said depressions presents a substantially rectangular outline with two side edges oriented in the transverse direction of said bumper and two end edges oriented in the longitudinal direction of said bumper and providing two pairs of wall parts synmmetrically converging towards the interior of the C-shaped profile respectively from said side edges and from said end edges.

4,116,481
LIFTING SLINGS AND A METHOD FOR PRODUCING SAME

Karl Moritz Raue, Basel, Switzerland, assignor to Spanset Inter A.G., Basel, Switzerland

Filed Dec. 20, 1976, Ser. No. 752,954
Claims priority, application United Kingdom, Dec. 24, 1975, 52785/75
Int. Cl.² B66C 1/16
U.S. Cl. 294—74 9 Claims

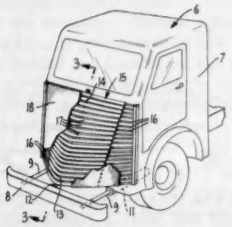


1. A load-lifting sling comprising a first loop of strip material, a second loop of strip material contigous with said first loop and bonded thereto, a plurality of fibre bundles located between said first and second loops of strip material and spaced one from another transversely across the width of the strip material of the sling, each fibre bundle comprising a length of fibre wound continuously as a hank, and means for allowing the strip material to be selectively longitudinally divisible between two fibre bundles along a portion of its length to provide at least one integral lashing component.

4,116,482
VEHICLE AIRFLOW CONTROL DEVICE

Leonard Lee Spiegel, 152 Buena Vista, Mill Valley, Calif. 94941

Filed Apr. 13, 1977, Ser. No. 787,004
Int. Cl.² B62D 35/00
U.S. Cl. 296—1 S 10 Claims



1. A streamlining device for attachment to a land vehicle comprising:

a bumper attached to a land vehicle to be movable toward and away of that vehicle;

bumper moving means on the land vehicle for moving said bumper while the vehicle is in motion;

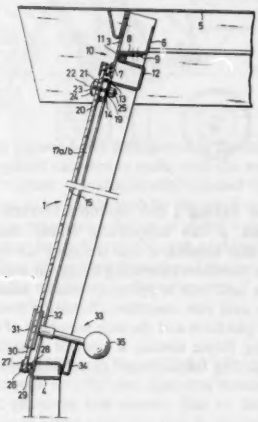
an air deflecting structure attached to the land vehicle at one end of that vehicle to be essentially upright and to have a top end and a bottom end, said air deflecting structure top end being immovably attached to the land vehicle and said air deflecting structure bottom end being immovably attached to said bumper to be movable therewith so that said air deflecting structure moves with said bumper to change the orientation of said air deflecting structure with respect to the land vehicle as said bumper is moved toward and away of the land vehicle; and

control means on the land vehicle controlling said bumper moving means to move said bumper while the vehicle is in motion so that at low speeds said bumper is located in a position closely adjacent the vehicle one end and said air deflecting structure is essentially vertical to be flush with the vehicle one end and thereby define a blunt surface to the atmosphere, and at higher speeds said bumper is located in a position spaced from the vehicle one end and said air deflecting structure bottom end is spaced from the vehicle one end thereby tilting said air deflecting structure with respect to the vehicle into a streamlining orientation with respect to the vehicle.

4,116,483
WINDOW FOR VEHICLE CABS, ESPECIALLY FOR VEHICLES EMPLOYED IN AGRICULTURE AND IN CONSTRUCTION

Peter Kramer, Troisdorf-Spich, and Peter Buchholz, Cologne, both of Fed. Rep. of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Fed. Rep. of Germany

Filed Dec. 13, 1976, Ser. No. 750,162
Claims priority, application Fed. Rep. of Germany, Dec. 13, 1975, 2556309
Int. Cl.² B62D 33/06
U.S. Cl. 296—28 C 12 Claims



1. In combination: a motor vehicle cab having an upper frame member extending in the transverse direction of said cab, a lower frame member arranged in substantially parallel spaced relationship to said upper frame member, and two lateral frame members respectively arranged at the opposite ends of said upper and lower frame members and laterally interconnecting the same so as to define with each other and with said upper and lower frame members a substantially quadrangular window opening with the extension thereof in the transverse direction of said cab representing the length of said window opening and with the extension transverse to said length representing the width of said window opening; a window pane covering up said window opening and having an inner side facing toward the interior of said cab and having an oppositely located outer side facing away from the interior of said cab, said window pane having a first edge adjacent and substantially parallel to said upper frame member, a second edge opposite and substantially parallel to said first edge, and two lateral edges arranged opposite to each other and respectively extending from said first to said second edge; hinge means laterally spaced from each other and partly connected to said upper frame member and partly arranged on said inner side of said pane for hingedly connecting said window pane to said upper frame member; a yoke member bridging said hinge means and being connected thereto while being associated with and located exclusively only at said inner side along the first edge of said pane but in spaced relationship thereto, web means pivotally interconnecting said yoke member and said upper frame

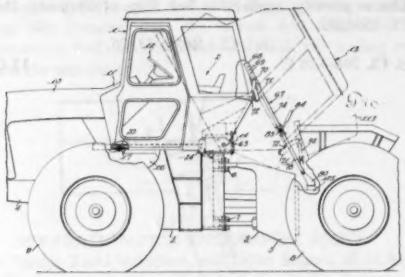
member relative to said hinge means, said yoke member having a longitudinal section arranged at and along said first edge while extending in the transverse direction of said cab, said yoke member also having lateral legs respectively arranged at said oppositely located lateral edges, said lateral legs having those ends thereof which are remote from said longitudinal section spaced from said second edge; and actuating means arranged between said second edge and said last mentioned legs and respectively connected to said legs and said lateral frame members.

4,116,484

TILTABLE CAB MOUNTING

Vernon W. Mangless, Mukwonago, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 17, 1976, Ser. No. 751,760
Int. Cl.² B62D *33/06*
U.S. Cl. 296—28 C **10 Claims**



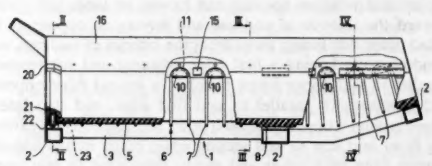
1. A tractor having a cab mounted thereon comprising, a tractor chassis, a cab supporting frame means resiliently mounted on said chassis, a cab defining an operator station including side members extending along the side of the cab and supported on said cab supporting frame means, a platform supported on said side members, fastening means removably fastening said platform and the side members of said cab to said cab supporting frame means, a control console mounted on said cab supporting frame means extending upwardly between said side members into said cab, pivotal support means resiliently mounted on said chassis and pivotally supporting the lower rear portion of said cab for pivotal movement above a horizontal axis, removable locking means for selectively and alternatively locking said cab in the operating position and releasing said cab for pivoting to a tilted position.

4,116,485

LOADING CAGE FOR BULK GOODS

Assar Svensson, Ersmark, Sweden, assignor to Skega AB, Ersmark, Sweden

Filed Aug. 18, 1976, Ser. No. 715,467
Int. Cl.² B62P *1/00*
U.S. Cl. 296—39 R **14 Claims**



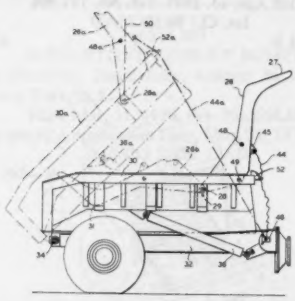
1. A container for receiving and carrying heavy bulk goods dropped into the container without suffering damage, the container comprising in combination: a substantially rigid supporting framework including means defining a base for the container and first and second opposite, generally parallel side members extending upwardly from the base; a sheet of an elastomeric material extending over the length of the container and having longitudinal edges disposed adjacent the side members, the sheet between its longitudinal edges defining at least a floor of a receptacle for the bulk goods and being further dimensioned so that such portions are at all times spaced apart from the framework; a plurality of generally parallel, flexible carrying means extending between the sides of the framework and in contact with an underside of the sheet so as to support the sheet over its length transversely to the carrying means; and means anchoring the carrying means to the sides; whereby bulk goods dropped into the receptacle are received by the elastomeric sheet without contacting and thereby damaging the rigid framework while the framework, in conjunction with the sheet and the carrying means supports the weight of the bulk goods.

4,116,486

RETRACTABLE ROCK GUARD FOR A DUMP TRUCK BODY

Ralph M. Duttarer, St. Joseph, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Apr. 21, 1977, Ser. No. 789,591
Int. Cl.² B60P *1/28*
U.S. Cl. 298—17 R **3 Claims**

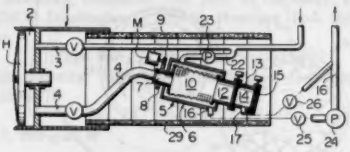


1. A retractable rock guard for a truck dump body, the dump body being normally horizontally disposed and pivotally connected near its rear extremity about a horizontal axis to a fixed frame portion of the truck and being selectively movable between the normal horizontally disposed position and a raised dump position, the retractable rock guard comprising a protective structure normally located in an upright position adjacent the front of the dump body and pivotally connected about a second horizontal axis to such dump body, means for detachably securing said protective structure to the dump body at a point spaced from said second horizontal axis, said securing means being operable to disconnect said protective structure from the dump body at said point when retraction is desired, the said protective structure being constructed and arranged so that when the dump body is raised to a dump position the center of mass of the protective structure passes through a vertical plane intersecting said second horizontal pivot axis and the protective structure pivots to the rear and retracts downwardly onto the dump body.

4,116,487
DEVICE FOR REMOVING GRAVELS AND THE LIKE FROM DISCHARGED MUD IN HYDRAULIC TUNNEL BORING SYSTEM

Hironobu Yamazaki, Kashiwa; Yoshiaki Uchida, Koshigaya, and Akira Nakaya, Tokyo, all of Japan, assignors to Tekken Construction Co. Ltd., Tokyo, Japan

Filed Jan. 24, 1977, Ser. No. 762,106
Claims priority, application Japan, Mar. 8, 1976, 51-24074
Int. Cl.[2] E21D *9/08;* E21C *39/00*
U.S. Cl. 299—1 3 Claims



1. In a hydraulic tunnel boring system in which pressurized water is fed to a hydraulic chamber at a boring head of a shield type tunnel boring machine through a feeding pipe for excavating ground formation, and excavated mud is discharged together with said water out of a tunnel being bored through a discharging pipe, a device for removing gravels, stones, rocks and the like of relatively larger sizes out of said excavated mud to be discharged, which comprises a rotatably mounted classifying means connected to said discharging pipe, said classifying means being of a lattice-shape, a housing surrounding said classifying means for rotatably retaining the classifying means and receiving the water and mud passed through the classifying means, a primary chamber communicating with a discharging side of the classifying means for receiving and storing separated gravels and the like of the relatively larger sizes from the classifying means, a secondary chamber communicating with said primary chamber for receiving and retaining such gravels and the like from the primary chamber, a primary valve means provided between said primary and secondary chambers for permitting removal of the gravels from the primary chamber to the secondary chamber when the primary chamber is filled with such gravels and the like, and a secondary valve means provided at a discharging side of the secondary chamber for permitting discharge of the gravels and the like when the secondary chamber is filled with the gravels and the like received from said primary chamber.

4,116,488
IN-SITU MINING METHOD AND APPARATUS

Limin Hsueh, Bedford; Robert A. Hard, Still River; Donald H. Davidson, Bedford, and Ray V. Huff, Acton, all of Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

Filed Sep. 20, 1976, Ser. No. 724,548
Int. Cl.[2] E21C *43/28*
U.S. Cl. 299—4 98 Claims

1. A process for the in-situ mining of a metal value selected from the group consisting of copper, nickel, molybdenum and mixtures thereof from an underground igneous ore body located at a depth of 800 ft. or more, said ore body having a permeability such that the product of the ore body thickness in ft. and permeability in md is a value of 20,000 md-ft or less, said ore also having minute fractures in which the metal values to be recovered are located in chemical combination with sulfur in a mineral of the generel formula MFe_ySx, said process comprising:

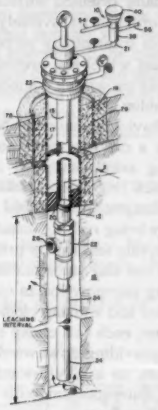
(a) drilling at least one injection hole and at least one production hole into said ore body;

(b) introducing a two-phase lixiviant down said injection hole and into a leaching interval in said ore body, said leaching interval being beneath the water table, said two-phase lixiviant being formed from

(1) an aqueous leach liquor capable of solubilizing the metal values, and,

(2) minute oxygen bubbles of a size small enough to enter the fractures in the ore body from which the metal values are to be recovered;

(c) forcing the two-phase lixiviant through the leaching interval of the underground ore body to enable the two-phase lixiviant to penetrate the ore body through the



fractures in the ore body and to enable the oxygen bubbles in the two-phase lixiviant to react with the sulfur to which the metal values are chemically bonded to enable the metal values to be solubilized by the aqueous leach liquor to produce a pregnant solution of metal values, said two-phase lixiviant being forced through said leaching interval by controlling the surface pressure of the two-phase lixiviant so that the minimum surface pressure, P_{SM}, in psi, is in accordance with the equation -

$$P_{SM} \geq \left(\frac{354.7\,[1.5x + 0.75y + 0.25z]}{MW}\right)\left(\frac{1-f_{gc}}{f_{gc}}\right)M/E, \text{ in psi}$$

where M is the metal loading in gpl of the metal value to be recovered, E is the overall efficiency of oxygen utilization, MW is the molecular weight of the metal ion to be recovered, z is the valance of the metal ion to be recovered, y and x are the subscripts for Fe and S respectively in a mineral of the general formula MFe_ySx, where M is the metal to be recovered, and f_{gc} is the gas volume fraction associated with bubbly flow, the pressure of the two-phase lixiviant also being controlled so that the pressure of the two-phase lixiviant at the top of the leaching interval is less than the fracture pressure of the ore;

(d) withdrawing the pregnant solution to the surface through a production hole; and,

(e) recovering metal values from the pregnant solution.

4,116,489
LOCK RING FLANGED TIRE CARRYING RIM AND WHEEL

William D. Walther, Kettering, Ohio, assignor to Dayton-Walther Corporation, Dayton, Ohio

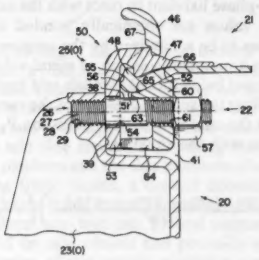
Continuation-in-part of Ser. No. 592,503, Jul. 9, 1975, abandoned. This application Dec. 13, 1976, Ser. No. 749,242
Int. Cl.[2] B60B *23/10*
U.S. Cl. 301—12 R 3 Claims

1. A combination of dual inner and outer tire carrying rims seated and locked by fastening assemblies on a vehicle wheel, said wheel having a plurality of inner and outer spoke members, each of said inner spoke members having a felloe

comprising axially oriented and radially inclined surfaces and a radially directed surface extending inwardly from each of said axially oriented surfaces substantially perpendicular to the rotational axis of said wheel and providing a mounting location for an axially projecting component of said inner rim fastening assemblies, each of said outer spoke members having a felloe comprising spaced-apart axially projecting wing portions providing outwardly facing dual axially oriented surfaces and a radially directed surface oriented transversely between said axially oriented surfaces substantially perpendicular to the rotational axis of said wheel and providing a mounting location for an axially projecting component of said outer rim fastening assemblies,

each of said rims having a removable bead flange with a lock ring carried by a rim base edge portion having radially inwardly facing axially oriented and radially inclined surfaces, said lock ring having radially inwardly projecting mounting flanges, the terminal portion of each said mounting flange being radially directed and having a bore therein for receiving said axially projecting component of each said inner rim and outer rim fastening assembly,

each said fastening assembly for an outer rim comprising a threaded fastener and a clamp element supported by said threaded fastener, each said clamp element having lateral wing portions providing downwardly facing dual axially oriented surfaces, an axially inwardly directed member, and a radially outer portion with axially oriented and radially inclined surfaces,



whereby, said inner rim is seated on, and thereafter locked on, said inner spoke members by tightening of said inner rim fastening assemblies and the mating engagement of said axially oriented and radially inclined surfaces on each said inner spoke felloe with said axially oriented and radially inclined surfaces on said inner rim base edge portion and by the mating engagement of said radially directed surface on each said inner spoke felloe with said terminal portion of each said inner rim mounting flange, and,

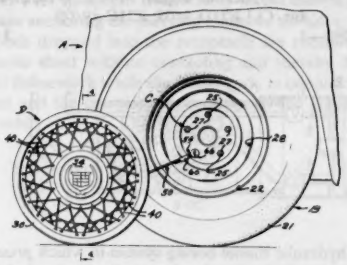
whereby, said outer rim is seated on, and thereafter locked on, said outer spoke members by tightening of said outer rim fastening assemblies and the mating engagement of said radially directed surface on each said outer spoke felloe with said terminal portion of each said outer rim mounting flange and by the mating engagement of said axially oriented and radially inclined surfaces on each said outer rim base edge portion with said axially oriented and radially inclined surfaces on said radially outer portion of each said clamp element of each said outer rim fastening assembly, said downwardly facing dual axially oriented surfaces on said lateral wing portions of each said clamp element being in mating engagement with said outwardly facing dual axially oriented surfaces on each said outer spoke felloe and said axially inwardly directed member of each said clamp element being in mating engagement with said terminal portion of each said outer rim mounting flange.

4,116,490

CABLE TYPE LOCK FOR WIRE WHEEL HUBCAPS

Eddie Huff, 1949 Handley Ave., SW., Atlanta, Ga. 30310, and Walter L. Huff, 149 Martha Ave., NE., Atlanta, Ga. 30317

Filed Jun. 29, 1977, Ser. No. 811,354
Int. Cl.[2] B60B 7/00
U.S. Cl. 301—37 AT **7 Claims**



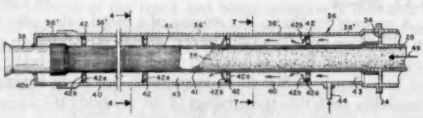
1. As an article of manufacture for use in association with a lug mounted vehicle wheel a wire wheel hubcap removably attached to the vehicle wheel and wherein said wire wheel hubcap includes a mounting rim, a cover, a plurality of spokes detachably interconnected to and extending between said mounting rim and said cover, spaced apart stud means for attaching said cover to said mounting rim whereby to securely mount said spokes in juxtaposed relationship between said mounting rim and said cover, said cover, studs and mounting rim defining a circumferential enclosed area within the hubcap and as to which a member entrained therewithin is accessible for removal therefrom only on disconnection and separation of said cover from said mounting rim, a wire wheel hubcap theft preventing device including a relatively elongate flexible member having means at one end thereof for relatively fixed attachment of said one end thereof to a lug mount of said vehicle wheel, the other end of said flexible member comprising a loop attachable about and entrained within said circumferential enclosed area, said elongate flexible member being of a length to permit said wire wheel hubcap to be removed and displaced a sufficient distance from a vehicle wheel receiving the same in order that ready access may be had to the lug mounting by which such vehicle wheel is mounted on a vehicle.

4,116,491

TUBULAR PNEUMATIC CONVEYOR PIPELINE

Lemuel Leslie Ply, Rte. 1, Box 354 E, Wimberley, Tex. 78676

Continuation-in-part of Ser. No. 638,114, Dec. 15, 1978, abandoned. This application May 12, 1977, Ser. No. 796,491
Int. Cl.[2] B65G 53/18
U.S. Cl. 302—29 **6 Claims**



1. An apparatus for conveying a solid product, comprising:

a conveyor pipeline having an outer impervious pipe and an inner porous pipe radially spaced therefrom to form an annulus therebetween from the upstream end of the pipeline to the downstream end of the pipeline;

first and second end walls between said inner and outer pipes, said inner pipe receiving at the upstream end thereof a propelled solid product which is conveyed by said inner pipe to the downstream end thereof;

longitudinally spaced divider means between said inner and

outer pipes dividing said annulus into a plurality of chambers;

each divider means having at least one uni-directional pressure-responsive vent, each vent being biased to open in the downstream direction; and

a gas inlet fluidly connected to the upstream portion of said annulus for receiving pressurized gas.

4,116,492

BRAKE VALVE ARRANGEMENT FOR A TWO-CIRCUIT BRAKE SYSTEM

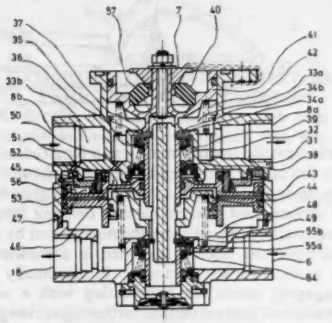
Erich Reinecke, Beinhorn, Fed. Rep. of Germany, assignor to WABCO Westinghouse GmbH, Hanover, Fed. Rep. of Germany

Filed Nov. 3, 1976, Ser. No. 738,601

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1975, 2548973

Int. Cl.² B60T *8/22, 15/12*

U.S. Cl. 303—22 R **2 Claims**



1. A two-circuit brake system for use with motor vehicles having at least two axles, said brake system comprising:

(a) a housing;

(b) a brake valve device in said housing;

(c) manually operable means for actuating said brake valve device;

(d) first piston valve means connected to said manually operable means and operable, upon movement of the manually operable means up to a certain amount, for controlling the amount of pressure in a first pressure chamber in the brake valve device;

(e) a relay piston assemblage operable to a braking position in response to pressure in said first pressure chamber and in a control pressure chamber acting jointly on a pressure surface area of the relay piston assemblage for controlling the amount of pressure in a second pressure chamber, said relay piston assemblage having a pair of intermediate control chambers formed therein adjacent said pressure surface area and connected, respectively, to the pressures in said first mentioned control chamber and in said first pressure chamber, said intermediate control chambers being separated from one another in a pressure-tight relationship,

(f) said first pressure chamber being connected, via a vehicle load-responsive brake pressure regulator, with brake cylinders on one of said axles for effecting braking thereof according to vehicle load, and said second pressure chamber being connected with wheel brake cylinders on the other of said axles for effecting braking thereof according to the amount of pressure in the second pressure chamber, the braking ratio between said one axle and said other axle being in accordance with the ratio of the pressure in said first and control chambers relative to the pressure in said second chamber; and

(g) a supplementary ring fixed concentrically in said housing and on the relay piston assemblage and which, along with an intermediate ring disposed within and concentrically relative thereto, acts to separate said intermediate control chambers in said pressure-tight relationship and to partly define the amount of said pressure surface area, being exposed to each of said intermediate control chambers said supplementary and intermediate rings being replaceable with respective rings of different dimensions so as to change the amount of said pressure surface area being exposed to each of said intermediate control chambers.

(h) said relay piston assemblage being tensionally connectable through a stem member with the manually operable means and being operable, in the event of failure of fluid pressure in said first chamber and upon movement of said manually operable means in excess of said certain amount, to its said braking position.

4,116,493

BRAKE PRESSURE CONTROL VALVE

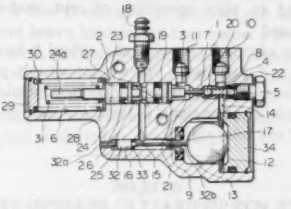
Yoshihiro Hayashida, Chigasaki, Japan, assignor to Tokico Ltd., Japan

Filed Nov. 10, 1977, Ser. No. 850,489

Claims priority, application Japan, Nov. 16, 1976, 51-154041[U]

Int. Cl.² B60T *8/14*

U.S. Cl. 303—24 A **4 Claims**



1. A brake pressure control valve including an inertia member being movable in response to the inertia force acting on said member, particularly when the rate of deceleration caused by braking action exceeds a predetermined amount, so as to close a fluid passage for controlling hydraulic braking pressure being supplied through said valve, in which a stop member is mounted in a housing of said valve and being operable manually from the outside of the housing so as to abut with the inertia member for preventing said fluid passage from being closed by said inertia member.

4,116,494

TEST CIRCUIT FOR PERIODICALLY MONITORING THE INTEGRITY OF AN ANTISKID BRAKE CONTROL SYSTEM

Wolfgang Gudat, Hanover, Fed. Rep. of Germany, assignor to WABCO Westinghouse GmbH, Hanover, Fed. Rep. of Germany

Filed Oct. 5, 1977, Ser. No. 839,545

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1976, 2646061

Int. Cl.² B60T *8/02*

U.S. Cl. 303—92 **9 Claims**

1. A test circuit for an antiskid brake control system of a vehicle, said antiskid system including a wheel speed sensor and modulator valve means via which the vehicle brake pressure is regulated in accordance with wheel behavior signals developed from the output frequency of said wheel speed sensor, said test circuit comprising:

(a) pulse generator means;

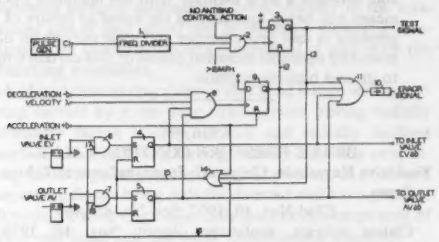
(b) circuit means subject to the output of said pulse generator means for initiating a periodic test signal, comprising:

(i) an AND gate having a first input connected to the output of said pulse generator means, a second input subject to a signal representative of the vehicle speed

exceeding a certain chosen value, and a third input subject to a signal indicative of the antiskid brake control system being inactive; and

(ii) a first flip-flop circuit having a set input connected to the output of said AND gate, a stable output providing said periodic test signal when a signal is present at the output of said AND gate, and a reset signal;

(c) a frequency divider circuit operative responsive to said test signal for reducing the output frequency of said wheel



speed sensor to simulate a wheel behavior condition in response to which said wheel behavior control signals are provided to pilot operation of said modulator valve means; and

(d) a logic circuit for sensing said wheel behavior control signals and modulator valve pilot signals produced in accordance with said wheel behavior control signals so as to provide an error signal in the absence of any one of said control and pilot signals.

4,116,495

DEVICE FOR HYDRAULIC BRAKING SYSTEM INCORPORATING ANTISKID CONTROL APPARATUS

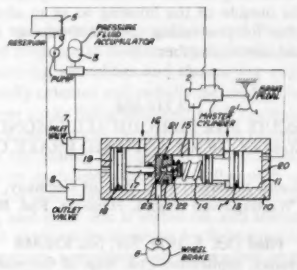
Juan Belart, Walldorf, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Sep. 12, 1977, Ser. No. 832,261

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1976, 2644659

Int. Cl.² B60T *8/00*

U.S. Cl. 303—115 **8 Claims**



1. A device for hydraulic braking systems incorporating antiskid control apparatus comprising:

a main piston disposed in a slidably sealed relation with a bore of a housing, one end of said main piston defining an outlet chamber connected to at least one wheel braking cylinder;

a passageway disposed in said main piston connecting an inlet chamber with said outlet chamber, said passageway adapted to be closed off by a valve member, said valve member being mechanically kept in the open position when the volume of said outlet chamber is smallest;

a control piston disposed adjacent said outlet chamber to displace said main piston to increase the volume of said outlet chamber; and

a reaction piston disposed to abut the other end of said main piston, said main piston and said reaction piston defining said inlet chamber communicating with a master cylinder, the actuation surface of said reaction piston remote from said main piston defining a reaction chamber in direct communication with a pressure-fluid accumulator.

4,116,496

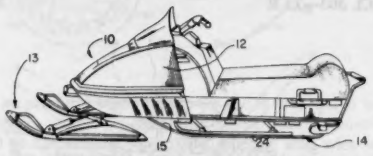
INTERNAL SNOW DEFLECTOR FOR SNOWMOBILE TRACK

Gary Scott, Idaho Falls, Id., assignor to Bombardier Limited, Valcourt, Canada

Filed Sep. 9, 1974, Ser. No. 504,261

Int. Cl.² B62D *55/20*

U.S. Cl. 305—12 **15 Claims**



1. A snowmobile track comprising: a longitudinally-flexible generally flat belt of one-piece construction formed in an endless loop having an external ground-engaging surface and an internal surface, said internal surface defining longitudinally extending laterally spaced areas for engagement by suspension elements when the track is mounted in a snowmobile, said internal surface further including longitudinally extending drive engaging means for cooperating with a snowmobile drive means, said internal surface further comprising a continuous series of projecting ribs separate from said drive means positioned on said internal surface between said laterally spaced areas throughout the length of said belt, said ribs having a total lateral extent which corresponds to at least the major part of the lateral spacing between said laterally spaced areas and being constructed and arranged such that in operation they will sweep the region between the suspension elements of the snowmobile and inhibit compaction of snow in this region.

4,116,497

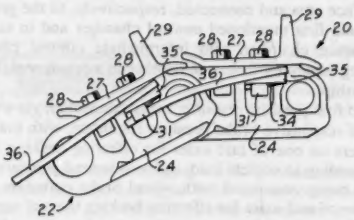
APPARATUS FOR REDUCING TRACK NOISE IN A TRACK-TYPE VEHICLE

James E. Schimpf, Joliet; Roger L. Boggs, East Peoria, and Malcolm H. Kinsinger, Washington, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jun. 16, 1976, Ser. No. 696,456

Int. Cl.² B62D *55/22*

U.S. Cl. 305—41 **13 Claims**



1. In a track for a track-type vehicle, said track comprising an endless drive chain made of a plurality of interconnected substantially identical links, means for reducing the noise made by circulation of said track during movement of said track-type vehicle comprising a plurality of elongated devices, means

projecting laterally of said drive chain for rigidly mounting each of said plurality of elongated devices to a different one of said plurality of links and a plurality of engagement surfaces projecting laterally of said drive chain each rigidly fixed with respect to a different one of said plurality of links, either or both said plurality of elongated devices and said plurality of engagement surfaces comprising resilient material, said plurality of elongated devices each extending between a different one of said mounting means and a different adjacent one of said engagement surfaces with one end thereof being carried by said mounting means, said elongated devices each extending across an interconnection between a different one of said links and a link adjacent thereto in said drive chain and cooperating with said engagement surface to resiliently oppose pivotal movement of said one link and said adjacent link in at least one direction with respect to each other about said interconnection therebetween.

4,116,498

TRACK CONSTRUCTION FOR TRACKED LAND VEHICLES SUCH AS TANKS

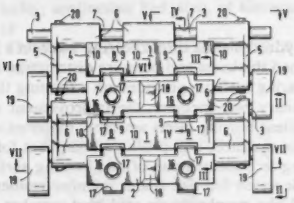
Hans G. K. Borner, Blieskastel-Mimbach, Fed. Rep. of Germany, assignor to Gerlach-Werke GmbH, Fed. Rep. of Germany

Filed Sep. 24, 1976, Ser. No. 726,111

Claims priority, application Fed. Rep. of Germany, Dec. 6, 1975, 2554981

Int. Cl.[2] B62D *55/20*

U.S. Cl. 305—58 R **14 Claims**



1. A track construction for land vehicles, such as tracked armored vehicles, said track construction comprising:

a plurality of track members each comprising first and second spaced parallel sets of transversely extending tubular members, said sets each comprising at least two tubular members mounted in axially spaced relationship so as to define a gap therebetween and having axially aligned bores therein, said track members each including a wheel contacting surface located on one side thereof and a ground engaging pad member located on the other side thereof and extending in both longitudinal directions of the track beyond the two connecting pins of the connection member;

a plurality of connection members each including a wheel contacting surface;

and connecting means, including a pair of connecting pins extending through resilient sleeves mounted in said aligned bores of said sets of tubular members, for connecting said connection members and said track members together in alternating relationship to form a track, said connection members engaging said connecting pins in gaps between said tubular members and the wheel contacting surfaces of said track members defining recesses in the areas of said gaps and portions of the wheel contacting surfaces of said connection members projecting into said gaps in the direction of said recesses.

4,116,499

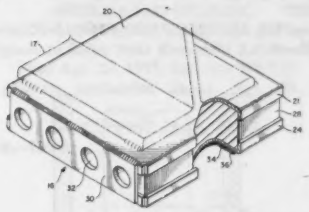
HIGH TEMPERATURE SLIDE BEARING

Daniel V. Laurizio, Convent, N.J., assignor to The Fluorocarbon Company, Anaheim, Calif.

Filed Aug. 12, 1977, Ser. No. 824,204

Int. Cl.[2] F16C *29/02*

U.S. Cl. 308—3 R **11 Claims**



1. In a slide bearing for high temperature applications:

a plate made of good heat conductive material; and

a layer of bearing material mechanically locked to said plate to form a slide bearing surface adapted to engage a mating, metal slide bearing surface, said layer of bearing material having a low coefficient of friction and being able to withstand heavy loads when kept below a predetermined temperature, portions of good heat conductive material connected to said plate and extending through said layer to form heat conductive paths to conduct heat quickly away from said layer to keep the temperature of said layer below said predetermined temperature.

4,116,500

ELONGATED MACHINE ELEMENT SPHERICAL END

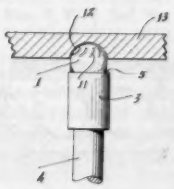
Wolfgang Huber, Schweinfurt, Fed. Rep. of Germany, assignor to SKF Kugellagerfabriken GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Jul. 5, 1977, Ser. No. 812,632

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1976, 7623823[U]

Int. Cl.[2] F16C *17/04*

U.S. Cl. 308—9 **9 Claims**



9. A bearing structure comprising a ball, a shell, said ball having a diameter at least equal to the inner diameter of said shell, said ball projecting from one end of said shell and being rigidly held therein, a shaft, the other end of said shell being press fit to said shaft and held rigidly thereon, said shaft extending only partways through said shell, and a bearing cup fit over said ball and engaging the spherical surfaces thereof, whereby said bearing cup and ball are relatively movable.

4,116,501

COOLING INSTALLATION FOR THE REDUCTION OF THE OIL TEMPERATURE OF OIL-LUBRICATED DAMPING BEARINGS

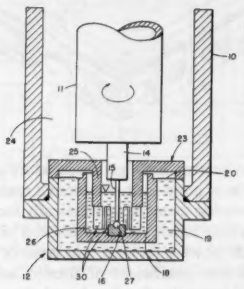
Karl Mötz, Munich; Josef Meyer, Olching, and Josef Schurrer, Deisenhofen, all of Germany, assignors to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft, Munich, Germany

Filed Jul. 13, 1977, Ser. No. 815,220

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1976, 2632977

Int. Cl.² F16C *37/00*; F16F *15/16*

U.S. Cl. 308—9 **8 Claims**



1. A cooling installation for reducing the temperature of an oil-lubricated, damped thrust bearing, for a vertically oriented high speed rotational body, having a bearing housing and an oil reservoir for the lubricating oil in which the bearing is immersed, comprising a cooling element constituted of a heat-conductive material substantially encompassing the bearing, said cooling element being in heat-conductive connection with the bearing housing and being at least partially immersed in the lubricating oil.

4,116,502

DUAL BEARING STRUCTURE FOR ROTATABLE MACHINE PARTS WITH ANTIFRICTION AND PLAIN BEARINGS

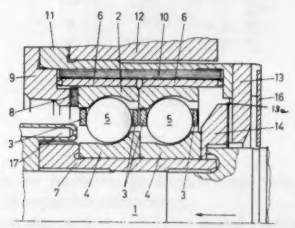
Hansulrich Hörler, Ulrich Linsi, both of Zurich, and Oswald Policke, Fislisbach, all of Switzerland, assignors to BBC Brown, Boveri & Company Limited, Baden, Switzerland

Filed May 24, 1977, Ser. No. 800,014

Claims priority, application Switzerland, Jun. 3, 1976, 7002/76

Int. Cl.² F16C *32/00*

U.S. Cl. 308—9 **10 Claims**



1. A dual bearing structure for a rotatable shaft of a machine such as a turbocharger and the like, comprising:

antifriction bearing means for accommodating axial forces acting only in one direction of the shaft and radial forces, the antifriction bearing means being located between the shaft and a bearing housing;

plain thrust bearing means for accommodating axial forces acting only in a direction opposite to the direction of the axial forces accommodated by the antifriction bearing means the plain thrust bearing means being located adjacent to the antifriction bearing means but having an axial clearance therebetween;

lubricating oil supply means for supplying oil to the antifriction bearing means and to the plain thrust bearing means; and

at least one oil drain channel extending radially of the shaft and having an inlet provided at a radial distance from the shaft which is at least at an outer diameter of the antifriction bearing means, the location of the inlet of the at least one oil drain channel causing a rotating ring of lubricating oil to form at an outer periphery of the antifriction bearing means as a result of centrifugal force during a rotation of the shaft.

4,116,503

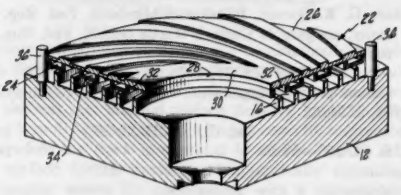
RESILIENT FOIL THRUST BEARINGS

Lazar Licht, San Mateo, Calif., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jun. 13, 1977, Ser. No. 805,760

Int. Cl.² F16C *17/08*

U.S. Cl. 308—9 **15 Claims**



11. In a hydrodynamic thrust bearing wherein a fluid film of predetermined thickness and pressure distribution is generated between bearing surfaces provided on a rotating thrust runner and a stationary base member, the improvement which comprises a resilient bearing insert assembly mounted on said base member, said assembly comprising a compliant foil-like membrane having as a surface one of said bearing surfaces and an integral reticulated foil-like spider member resiliently mounting said foil-like membrane on said base member, said spider member comprising a plurality of support members and an array of spring elements connecting said support members and being spaced from said membrane, said array of spring elements having a stiffness distribution matched to said pressure distribution to ensure desired clearance and loading in said thrust bearing.

4,116,504

SPHERICAL BEARING AND METHOD OF MAKING THE SAME

Ronald F. Cass, Villa Park, Calif., assignor to Bertea Corporation, Irvine, Calif.

Filed May 31, 1977, Ser. No. 802,068

Int. Cl.² F16C *11/06*

U.S. Cl. 308—72 **12 Claims**

1. A bearing comprising:

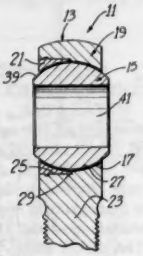
outer bearing means including an outer bearing member having an annular insert receiving surface and at least one annular insert sized to be received within said insert receiving surface;

snap-fit retention means including at least one annular projection and at least one annular recess for forming a snap fit to at least assist in retaining the insert within said insert receiving surface of said outer bearing member, said insert being sized so that it can be pressed into the outer bearing member until the projection snaps into the recess;

an inner bearing member at least partly within said outer bearing member, said inner bearing member being retained in the outer bearing member by said insert;

a bearing liner between said inner bearing member and said outer bearing means;

said outer bearing means including inner surface means for



engaging and supporting said bearing liner, at least a portion of said inner surface means being defined by said insert whereby the inner bearing member and the outer bearing means can undergo relative movement; and

an adhesive between said insert and said outer bearing member for at least assisting in retaining the insert within said outer bearing member.

4,116,505

BEARING FOR A SHAFT OF AN OPEN-END SPINNING ROTOR

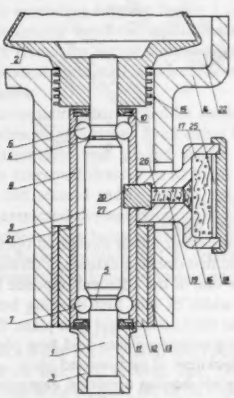
Hans Stahlecker, Süssen, Germany, assignor to Fritz Stahlecker and Hans Stahlecker, both of, Germany

Filed Oct. 17, 1977, Ser. No. 843,049

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1976, 2647816

Int. Cl.[2] **F16C** *1/24, 35/08;* **D01H** *1/12, 7/04*

U.S. Cl. 308—187 **13 Claims**



1. Open-end spinning machine apparatus comprising:

a spinning shaft having means at one end portion for carrying a spinning rotor and having means at another end portion for carrying a driving whorl,

first roller bearing means having first roller elements bearingly engaged directly on said spinning shaft,

second roller bearing means having second roller elements bearingly engaged directly on said spinning shaft at a position spaced from said first roller bearing means,

and an oil-feed device for dispensing oil dropwise in the area between the first and second roller bearing means to lubricate said bearing means, said oil-feed device comprising sealing element means adjacent said spinning shaft, said sealing element means including means for dispensing oil only when a predetermined pressure differential prevails between the area adjacent the spinning shaft and the sealing element means, said pressure differential being dependent on the operating speed of the spinning shaft.

4,116,506

PRELOADED BEARING

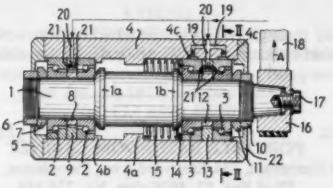
Sadao Moritomo, and Shigenori Ando, both of Narashino, Japan, assignors to Seiko Seiki Kabushiki Kaisha, Japan

Filed Apr. 28, 1977, Ser. No. 791,773

Claims priority, application Japan, Apr. 30, 1976, 51-56051[U]

Int. Cl.[2] **F16C** *33/16, 35/12*

U.S. Cl. 308—189 A **5 Claims**



1. A spindle device comprising a housing having a bore and a front end and a rear end, a plurality of antifriction radial thrust bearings in said bore comprising a front bearing fixed within said bore and a rear bearing axially slidable in said bore and spaced axially from said front bearing, a spindle rotatably supported by said bearings and having a rear end projecting beyond said housing, the projecting rear end of said spindle being subjected to a radial load in a predetermined radial direction, spring means acting axially on said axially slidable rear bearing and acting through said spindle on said front bearing to give said bearings a selected preload, means defining a recess between said rear bearing and said bore on the side of the bore toward which said rear bearing is pressed by said radial load on said spindle and duct means supplying pressurized lubricant from a common, source to said recess and to said bearings to lubricate said bearings and to apply to said rear bearing a radial force opposing and thereby counteracting said radial load applied to said spindle to facilitate axial movement of said rear bearing in said bore by said spring means.

4,116,507

RADIATOR CONCEALING ARTICLE OF FURNITURE

Frank Marusiak, Jr., Newark, N.J., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Nov. 7, 1977, Ser. No. 849,006

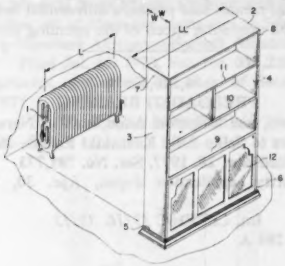
Int. Cl.[2] **F24H** *9/04;* **A47B** *81/00*

U.S. Cl. 312—210 **1 Claim**

1. A radiator concealing article of furniture for concealing a heating system radiator having a predetermined length, width and height, said article of furniture comprising

a bookshelf unit having a pair of parallel sides spaced from each other a distance greater than the length of the radiator, the sides being of the same dimensions and each having a bottom, a top and a predetermined width greater than the width of the radiator, a plurality of bookshelves extending between and supported by the sides in spaced parallel relation substantially perpendicular to said sides, the lowermost bookshelf being spaced a greater distance from the bottoms of the sides than the height of the radiator whereby the radiator is accommodated with clearance in the bookshelf unit between the sides and the lowermost bookshelf, a ledge provided in the lowermost bookshelf, a cover panel removably mounted in the bookshelf unit in perpendicular relation to the sides and the bookshelves,

said cover panel covering the area between the sides and the lowermost bookshelf and thereby covering the radiator and having screening therein for permitting a free flow



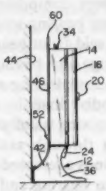
of air through said cover panel while obstructing a view of said radiator, and a securing device for clamping said cover panel to said ledge.

4,116,508

PORTABLE BATHROOM CABINET

Howard Sturtevant, 234 Eastwood Ave., Providence, R.I. 02919

Filed Sep. 17, 1976, Ser. No. 724,344
Int. Cl.[2] A46B *17/00*; A47F *5/08*
U.S. Cl. 312—245 **5 Claims**



1. A portable bathroom cabinet for traveling, comprising a generally rectangular cabinet having an open front, a pair of outwardly swinging doors mounted at the front, a tubular paper cup reservoir and dispenser mounted vertically in the center of said cabinet, means in said cabinet for holding the bathroom supplies, and a base for mounting said cabinet in a bathroom when said cabinet is not being used as a portable traveling cabinet, whereing said base comprises a base portion having a horizontal platform and a vertical wall portion extending upwardly from the rear edge of said platform, said vertical wall is spaced from the bathroom wall, said vertical wall having hooks on the rear thereof forholding brushes, the rear of said base is provided with a door fro forming a compartment for grooming accessories.

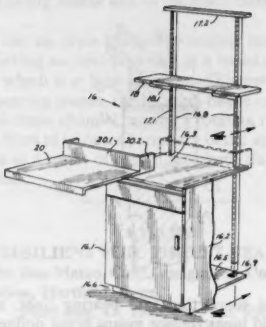
4,116,509

MODULAR FURNITURE UNIT FOR HOSPITAL PHARMACIES OR THE LIKE

Richard C. Smith, Edina, Minn., assignor to R. C. Smith Company, Minneapolis, Minn.

Filed Jul. 2, 1976, Ser. No. 702,106
Int. Cl.[2] A47B *97/00*
U.S. Cl. 312—257R **1 Claim**

1. Easily assembled free-standing modular furniture unit comprising a lower section including a self-supporting generally parallelepiped container having top and bottom walls, and an upper section, the lower section having at least a pair of spaced holes through its top wall and spaced inwardly from edges of the top wall, the lower section including upwardly exposed brackets carried by the bottom wall in vertical alignment with the top wall holes, the brackets having upright portions, at least a pair of upright support posts bearing at their upper ends the upper section and extending downwardly slideably through the top wall holes and in snug, supportive relationship with the holes, the posts having hollow lower ends receiving the upright bracket portions and removable up-



wardly therefrom and through the top wall holes, and an upwardly removable cover inserted over and joining the posts at their upper ends;

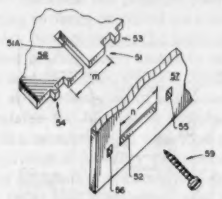
whereby the upper and lower sections may be easily assembled and disassembled by insertion and removal of the posts.

4,116,510

CHASSIS FORMED OF SHEET STOCK

Harold D. Franco, San Mateo, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Mar. 3, 1977, Ser. No. 773,984
Int. Cl.[2] A47B *43/00*
U.S. Cl. 312—257 SK **18 Claims**



1. Apparatus comprising:

first and second plates;

said first plate having a first elongated opening in one edge thereof; said first opening extending through said one edge and at least one of the adjacent opposite sides of said first plate, the width of said first opening being substantially equal to the thickness of said first plate, the length of said first opening extending into said first plate being greater than the thickness of said second plate;

said second plate having a second elongated opening in it; said second opening extending through opposite sides of said second plate, having a width substantially equal to the thickness of said first plate, and having a length that is greater than the width of said first opening;

a portion of said first plate and said one edge thereof including said first opening fitting securely into said second opening in said second plate so that opposing surfaces of said plates which form said first and second openings together define a third opening having a substantially square cross-section; and

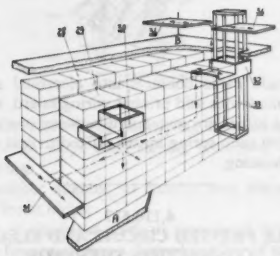
a screw threaded into said third and first openings in the direction of the length of the latter — first opening for holding said first and second plates together, wherein said

first plate has a first protrusion extending from an edge surface thereof with the first protrusion and first plate being in a common plane, said one edge containing the first opening being the exterior edge of said first protrusion and being spaced from said edge surface a distance which is substantially equal to the thickness of said second plate, said first protrusion being located in said second opening.

4,116,511
AUTOMATIC FILING CABINET RETRIEVAL APPARATUS

Natale Di Liddo, Borgo San Dalmazzo (Cuneo), Italy, assignor to Instituto Grafico Bertello S.p.A., Italy

Filed Feb. 28, 1977, Ser. No. 772,870
Claims priority, application Italy, Mar. 23, 1976, 12544 A/76
The portion of the term of this patent subsequent to Dec. 28, 1993, has been disclaimed.
Int. Cl.[2] B65G *17/00*; A47B *49/00*
U.S. Cl. 312—268 **6 Claims**



1. An automatic filing cabinet retrieval apparatus for delivery of drawers to a consultation station, comprising:

(a) two spaced, facing banks of filing cabinets having a plurality of filing cabinet drawers;

(b) a vertically extending support frame;

(c) b a first automatic retrieval saddle means mounted on said support frame for reciprocal vertical movement to and from a consultation station at a different vertical level than said banks;

(d) a second automatic retrieval saddle means between said banks for extracting a drawer from either bank and delivering said drawer to said second saddle means and for returning an extracted drawer to its bank;

(e) said first and second saddle means being operable to transfer an extracted drawer between them; and

(f) said first saddle means being operable to deliver a drawer to said consultation location and to return a said drawer from said consultation location to said second saddle.

4,116,512
DRAWER LATCHING DEVICE

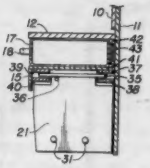
John A. Wiser, P.O. Box 192, Liberty, Tex. 77575

Division of Ser. No. 589,417, Jun. 23, 1975, Pat. No. 4,027,934. This application Nov. 8, 1976, Ser. No. 739,425
The portion of the term of this patent subsequent to Jun. 7, 1994, has been disclaimed.
Int. Cl.[2] A47B *58/00*; E05C *17/56*
U.S. Cl. 312—330 R **1 Claim**

1. A drawer latching device comprising

a body having openings therein,

drawers movably located in said openings and having a first metal plate member fixedly attached at the back thereof in operable alignment with a metal plate member immobily affixed to said body in contacting alignment with the first metal plate member on said drawer, said metal plate members contacting when said drawer is in the closed position in said body, at least one of said metal members being magnetized, thereby releasably maintaining the drawer in

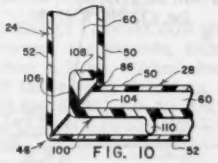


the closed position by magnetic attraction between said metal plate members.

4,116,513
DRAWER CONSTRUCTION

Myron E. Ullman, Jr., Canfield, Ohio, assignor to Kessler Products Company, Youngstown, Ohio

Filed Jan. 17, 1977, Ser. No. 760,084
Int. Cl.[2] A47B *88/00*
U.S. Cl. 312—330 R **22 Claims**



1. A drawer construction wherein a drawer side formation and a drawer back formation are formed integrally from a single, hollow, extruded plastic member which is folded along a miter-groove at a corner location between the side and back formations to form a corner of a drawer, and including snap-acting locking means carried in hollow portions of a selected one of the side and back formations at the location of a corner to be formed between these formations, the snap-acting locking means being operable when the formations are folded to close the miter groove lying therebetween to engage hollow portions of the other of these formations, for maintaining the folded configuration of these formations.

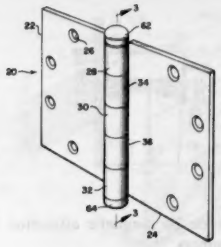
4,116,514
SECURITY HINGE

Tom M. Lawrence, Janesville, Wis., assignor to Lawrence Brothers, Inc., Sterling, Ill.

Filed Jul. 22, 1977, Ser. No. 817,984
Int. Cl.[2] H01R *39/00*
U.S. Cl. 339—4 **21 Claims**

1. A security hinge comprising a pair of leaves, one of said leaves including at least a pair of spaced end knuckles and the other of said leaves including at least one intermediate knuckle positioned between said end knuckles, said knuckles each including a central axial bore, said bores being aligned co-axially, a pin member disposed inside said bore of at least one of said end knuckles for rotation in unison therewith, and extending into said bore of said intermediate knuckle, stop means for preventing said pin member from being driven completely through said end knuckle bore, and means disposed in the bore of the other of said end knuckles to prevent said pin from being forced out of said one end knuckle, wherein said means includes a second pin member, such that one pin is associated with each of said end knuckles and each pin comprising a generally cylindrical body portion extending into said interme-

diate knuckle bore and an end portion of enlarged diameter disposed inside said bore of said end knuckle and engaged



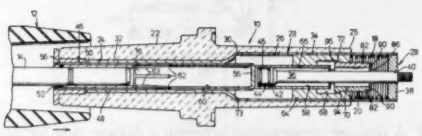
against said stop means to prevent further axially inward movement.

4,116,515

SPRING ACTUATED CONTACT FOR HIGH VOLTAGE BUSHING

Bruce G. Spicer, Waukesha, Wis., assignor to RTE Corporation, Waukesha, Wis.

Filed Nov. 22, 1976, Ser. No. 743,944
Int. Cl.[2] H01R *11/30*
U.S. Cl. 339—12 R **11 Claims**



1. A high voltage bushing comprising:
a housing,
an electrical conductor extending into said housing,
an electrical contact operatively connected to said conductor and mounted for movement within said housing from a first position to a second position,
first means for biasing said contact to move within said housing from the first position to the second position,
a magnetically responsive member moveably mounted in said housing and located in a position to respond to the magnetic field produced by current flow through said conductor, said magnetic member releasably holding said contact in the first position in said housing, and second means biasing said member toward a position to hold said contact in the first position, said magnetic member being responsive to a fault current for releasing said contact for movement by said first biasing means to the second position.

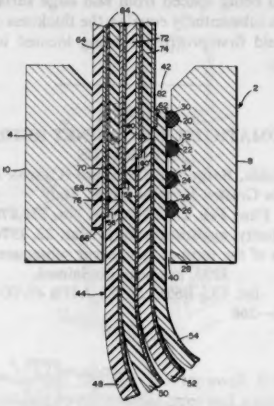
4,116,516

MULTIPLE LAYERED CONNECTOR

Wendell L. Griffin, Warren, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Jun. 24, 1977, Ser. No. 809,927
Int. Cl.[2] H05K *1/07*
U.S. Cl. 339—17 F **15 Claims**

11. A connector for a multiple layered printed wiring board, comprising:
a hollow housing formed by first and second opposing side walls and including a first aperture, at least one multiple layered cable having one end which extends through said first aperture and into said housing, one layer of said cable end including at least one cable contact, and at least one other layer at said cable end offset from said one layer and including at least one other cable contact,
a second aperture for said printed wiring board, and
a plurality of spring means internal of said housing for



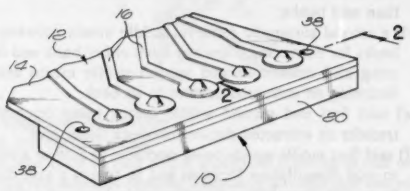
urging said cable contacts into electrical and physical engagement with said printed wiring board, said plurality of spring means are juxtaposed between one wall and said cable with each spring means affixed to said wall internal of said housing.

4,116,517

FLEXIBLE PRINTED CIRCUIT AND ELECTRICAL CONNECTION THEREFOR

Gerald J. Selvin, Huntington Beach, and John R. Moore, Santa Ana, both of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 673,958, Apr. 15, 1976, abandoned. This application Dec. 3, 1976, Ser. No. 747,238
Int. Cl.[2] H05K *1/02*
U.S. Cl. 339—17 F **9 Claims**



1. A printed circuit board connection assembly comprising:
a relatively rigid printed circuit board having a plurality of traces thereon;
a relatively flexible printed circuit comprising a flexible insulation sheet having a planar area generally parallel to said board and embodying conductive strips on the side thereof facing said board;
said conductive strips having contact projections thereon in said planar area arranged in a non-linear pattern matching selected areas of said traces on said board whereby said contact projections will be in registry with said selected areas, each said projection have a generally hermispherical configuration;
an elastomeric member on the side of said sheet opposite to said one side underlying said contact projections;
a relatively rigid pressure plate behind said elastomeric member; and
means for moving said board and said pressure plate toward

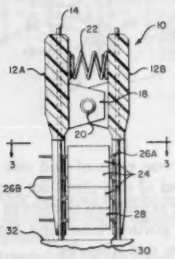
each other to compress said elastomeric member and, thereby, resiliently urge said contact projections into electrical contact with said traces on said board.

4,116,518

CLIP FOR PARALLELING PACKAGED INTEGRATED CIRCUIT CHIPS

Larry J. Pleskac, Escondido, Calif., assignor to NCR Corporation, Dayton, Ohio

Filed Aug. 31, 1977, Ser. No. 829,305
Int. Cl.[2] H05K *1/12*
U.S. Cl. 339—17 CF **10 Claims**



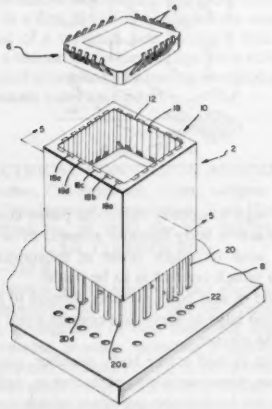
1. A clip for electrically paralleling a stacked plurality of integrated circuit chips each having a number of electrical pins, comprising:
a body member adapted to receive said plurality of integrated circuit chips;
a plurality of electrical contacts associated with said body member for connecting a desired number of said electrical pins in parallel; and
access openings thru said body member for enabling access to those of said electrical pins which are not connected in parallel by said electrical contacts.

4,116,519

ELECTRICAL CONNECTIONS FOR CHIP CARRIERS

Dimitry G. Grabbe, Lisbon Falls, Me., and Joseph Patrick Sweeney, Carlisle, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 2, 1977, Ser. No. 821,112
Int. Cl.[2] H01R *13/12*
U.S. Cl. 339—17 CF **7 Claims**



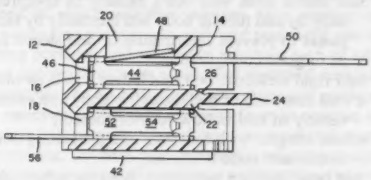
4. Packaging and interconnecting means for a plurality of microcircuit chips, said packaging and interconnecting means comprising:
a plurality of chip carriers and a chip carrier socket,
said chip carriers each comprising a generally prismatic housing having oppositely directed faces and laterally facing sides, each of said microcircuit chips being contained in one of said chip carriers, a plurality of contact leads on said sides of each of said chip carriers, said leads extending in parallel spaced-apart relationship between said faces, said leads extending into said housing and being electrically connected to the chip contained therein,
said socket comprising an insulating body having an open end and having a chip-receiving well extending therein from said open end, said chip carriers being in stacked relationship in said well,
a plurality of parallel conductors in said well extending inwardly from said open end, said conductors being spaced-apart by distances which correspond to the spacing between said contact leads, said contact leads being in electrical contact with said conductors,
said conductors being selectively interrupted between adjacent chip carriers by discontinuities thereby selectively to interconnect said leads of said plurality of chips, and
selected ones of said conductors extending externally of said socket and serving as input and output conductors.

4,116,520

CLOSED ENTRY CONNECTOR HOUSING

Gary Lee Zimmerman, Shermansdale; Richard Paul Clark, Hershey, and John A. Rehm, Mechanicsburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 6, 1977, Ser. No. 830,978
Int. Cl.[2] H01R *13/40;* **H05K** *1/12*
U.S. Cl. 339—59 R **6 Claims**



1. A closed entry electrical connector assembly comprising:
a housing of insulating material having a mating face, a bottom wall, parallel upper and lower rows of contact receiving cavities opening onto said mating face, each row having a like plurality of cavities, an intermediate wall separating said rows of cavities, said intermediate wall having an end portion remote from said mating face moveable from a first portion in the plane of the wall to a second position extending normal to the plane of the wall and closing one end of said lower row of cavities locking means in said bottom wall receiving said end portion in said second position;
a like plurality of first electrical terminals received in said upper row of cavities; and
a like plurality of second terminals received in the lower row of cavities.

4,116,521

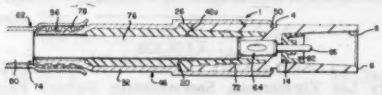
MINIATURE UNIVERSAL CONNECTOR MODULE

Henry Otto Herrmann, Jr., Mt. Joy, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 731,180, Oct. 12, 1976, abandoned. This application Jul. 25, 1977, Ser. No. 818,798
Int. Cl.[2] H01R *13/52*
U.S. Cl. 339—60 R **9 Claims**

1. An electrical connector, comprising:
a rigid dielectric body,

a molded tubular body of elastomeric dielectric having hollow interior provided with an integral web which is joined to said tubular body, said web having an initial configuration bridging across said hollow interior,
said web having a central aperture therethrough,
an electrical lead having a central conductor provided thereover with an insulation jacket,
a portion of said conductor being received in the hollow interior of said tubular body,
said tubular body yielding elastically radially outward upon receipt of said insulation jacket in the hollow interior thereof,
said tubular body exerting a residual elastic radial grip on said insulation jacket to form a gas tight seal thereover,
said electrical lead being received through the central aperture of said web,
said web being stretched elastically to an elongate sleeve form encircling and elastically gripping a section of said insulation jacket to form a gas tight seal thereover,
said sleeve form web extending longitudinally of said hollow interior of said tubular body,
said tubular body elastically yielding radially outward to accommodate said sleeve form web,
said tubular body forming a gas tight sheath intimately and



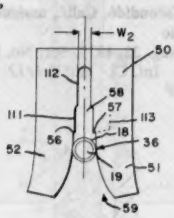
compressibly encircling the length of said sleeve form web and a longitudinal section of said insulation jacket which is disposed in said tubular body and which is immediately adjacent said sleeve form web,
said sleeve form web being radially in compression externally by said tubular body and internally by said insulation jacket to prevent reformation of said sleeve form web to its original configuration,
said rigid dielectric body including a hollow interior,
a wall internally of said dielectric body and extending transversely of said hollow interior thereof,
a boss integral with said wall and projecting concentrically within said hollow interior,
said boss having a concentric bore therethrough communicating with a forward end portion of said rigid dielectric body,
a forward end portion of said tubular body yieldably elastically engaged in the hollow interior of said rigid dielectric body forming a gas tight seal therewith,
said forward end of said tubular body encircling said boss to form a gas tight seal therewith,
said conductor of said electrical lead being connected to an electrical terminal mounted in said bore of said boss, and
means securing together said tubular body and said rigid dielectric body.

4,116,522
SLOTTED TERMINAL

Charles Edward Reynolds, Mechanicsburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 703,725, Jul. 9, 1976, abandoned, which is a continuation-in-part of Ser. No. 607,401, Aug. 25, 1975, abandoned. This application Dec. 2, 1977, Ser. No. 856,877
Int. Cl.² H01R *11/20*
U.S. Cl. 339—97 R **2 Claims**

1. In an electrical connecting device of the type comprising a plate-like sheet metal member having a wire-receiving end and having a wire-receiving slot extending inwardly from said wire-receiving end, said slot having opposed edges and having an inner end portion which constitutes a wire contacting portion, said opposed edges being spaced apart by a distance which is less than the diameter of a wire for which said device is intended, the improvement to said connecting device comprising:
at least one generally L-shaped cut line in said plate-like member, said cut line having a first portion which extends transversely from one of said edges of said slot and having a second portion which extends from said first portion generally parallel to said slot towards said inner end portion of said slot,

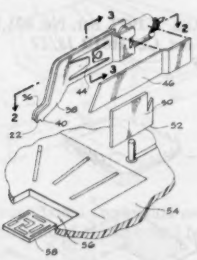


a shoulder on said one edge of said slot which faces said wire-receiving end of said plate-like member, said shoulder being located at said first portion of said cut line, said wire contacting portion extending from said shoulder towards said inner end whereby,
upon movement of a wire laterally of its axis and into said slot and into said wire contacting portion, said shoulder penetrates the insulation of said wire and electrical contact is established with said wire in said wire contacting portion.

4,116,523
HIGH FREQUENCY PROBE

Charles W. Coberly, Pasadena, and Howard A. Lewis, Yorba Linda, both of Calif., assignors to James M. Foster, El Monte, Calif.

Filed Jan. 23, 1976, Ser. No. 651,962
Int. Cl.² H01R *13/36*; G01R *31/02*
U.S. Cl. 339—108 TP **7 Claims**

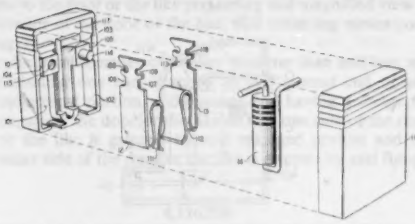


1. A novel high frequency electrical probe comprising:
a blade-like active body member adapted to be supported at one end with its major plane at substantially 90° to a circuit to which contact is to be made;
the other end of said body member formed to have a generally pointed edge to serve as a contact point to be abutted against the circuit;
on both sides of said active body member, ground contacts which are approximately coextensive with said body member, but having pointed edges which abut said circuit at points slightly displaced from the contact point of said active body member.

4,116,524
TERMINAL BRIDGING ASSEMBLY

Ernest Gerard DeNigris, Colts Neck; Joseph Girardi, Edison, both of N.J., and William Edwin Ruehl, Wheeling, Ill., assignors to Illinois Tool Works, and Bell Telephone Laboratories, Incorporated, Murray Hill, N.J., a part interest to each.

Filed Jun. 29, 1977, Ser. No. 811,293
Int. Cl.[2] H01R *3/00*
U.S. Cl. 339—113 R **31 Claims**



1. An assembly for bridging closely spaced electrical terminals of connector blocks having a variety of terminal spacings the assembly comprising:

a housing constructed of an electrically insulative material, said housing comprising,

a plurality of spaced ports having one end opening to the outer surface of said housing,

a component cavity disposed between said ports,

a connection cavity adjacent to the closed end of said ports and communicating with one end of said component cavity,

a passageway between each said closed end of each said port and said connection cavity;

at least one electrical element located in said component cavity having at least two leads formed to enable said leads to fit into said connection cavity;

first and second electrical contacts adapted to fit within said ports, each said electrical contact including,

means for fixing a first end of each said contact in said passageway of said housing such that the tip of said first end extends into said connection cavity while enabling the free movement of a second end of each said contact,

means for receiving in electrical contact at said tip of first end of said first contact a first lead of said element,

means for receiving in electrical contact at said tip of first end of said second contact a second lead of said element, and

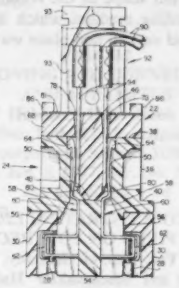
means for allowing deflection of each said contact by providing contact surfaces which will cause each said contact to move in a first direction to align for a connection with a terminal of a terminal pair having a first spacing and move in a second direction to align for a connection with a terminal of a terminal pair having a second spacing when said terminals enter said ports.

4,116,525
ELECTRICAL CONNECTOR ASSEMBLY

James J. Johnston, Old Saybrook, Conn., assignor to Automatic Equipment Development Corporation, West Haven, Conn.

Filed Jan. 27, 1977, Ser. No. 763,281
Int. Cl.[2] H01R *9/00*
U.S. Cl. 339—132 B **14 Claims**

1. In combination with a multi-contact electrical connector adapted for mounting on a panel and for connection to end portions of a multiplicity of first electrical conductors and having an insulated housing including a mating side and a connecting side, said housing having an elongated recess opening through said mating side and a mating surface surrounding said recess, means defining at least one contact supporting wall within said recess and extending longitudinally thereof, and at least one set of electrical contact terminals supported in longitudinal series in said housing, each of said contact terminals having a connecting portion exposed at the connecting side of said housing for connection to an associated one of the first electrical conductors and a contact portion disposed in said recess, the contact portions of said one set being arranged in longitudinal series generally adjacent said one contact supporting wall, a unitary conductor adaptor made from electrical insulating material and in plugging engagement with said electrical connector, said conductor adaptor including a panel section overlying an associated portion of said mating surface and a plugging section integrally connected to and projecting from said panel section and extending into said recess in plugging relation thereto, said adaptor having means for receiving axially elongated generally cylindrical bare terminal end portions of a multiplicity of individual second electrical conductors axially inserted thereinto when said conductor adaptor is in plugging engagement with said electrical connector, guiding



each of the axially inserted end portions to slide relative to an associated one of said contacting portions to a position of electrically contacting engagement with said associated one of said contacting portions, and releasably retaining each of said bare terminal end portions in its position of electrical contacting engagement with an associated one of said contact portions to be freely removable in an axial direction from its position of electrical contacting engagement and from an associated aperture, said receiving, guiding, and releasably retaining means comprising at least one row of conductor end portions receiving apertures extending through said panel section and arranged in longitudinal series therealong, and at least one longitudinally spaced series of parallel conductor guide slots formed in said plugging section, each of said guide slots communicating with an associated aperture in said one row and opening toward said one contact supporting wall and an associated one of said contact portions.

4,116,526
DOUBLE MODULATION HOLOGRAPHIC RECORDING TECHNIQUE

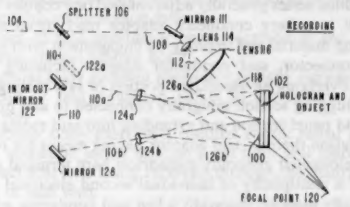
Burton Ross Clay, Wayland, and Gardner Thomas Burton, Danvers, both of Mass., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 16, 1976, Ser. No. 714,498
Int. Cl.[2] G02B *27/00*
U.S. Cl. 350—3.67 **5 Claims**

1. A holographic recording method for enhancing the dynamic range of pictorial information manifested by an object transparency exhibiting relatively small dynamic range, where "relatively small dynamic range" is defined as a dynamic range which is materially smaller than that possible in a reconstructed image of a directly-viewable recorded hologram; said method comprising a step of:

simultaneously illuminating an area of a recording plane of a hologram recording medium through a relatively-poor dynamic range object transparency situated in substantially direct contact with said area with each of first and

second beams of mutually coherent light, said first and second beams having a given angular displacement with respect to each other, said first beam having a certain non-plane wavefront shape in the recording plane of said



hologram recording medium, said second beam having a wavefront shape in the recording plane of said hologram recording medium shape in the recording plane of said hologram recording medium which is substantially the conjugate of said certain non-plane wavefront shape.

4,116,527

DEVICE FOR CONCENTRATING LIGHT FROM A LINEAR FIELD ON TO A RECEIVER

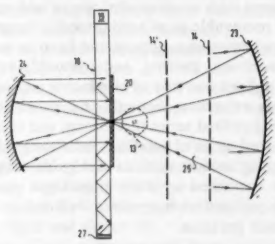
Erwin Sick, Icking, Fed. Rep. of Germany, assignor to Erwin Sick Gesellschaft mit beschrankter Haftung Optik-Elektronik, Waldkirch, Fed. Rep. of Germany

Filed Nov. 3, 1976, Ser. No. 738,340

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1975, 2550815

Int. Cl.² G02B *27/17*

U.S. Cl. 350—6.7 **17 Claims**



1. An apparatus for concentrating light from a linear field onto a relatively small receiver, comprising: a rod light guide with a peripheral surface, said receiver being disposed at the end of said rod light guide on the peripheral surface of which light emanating from the linear field is directed, a first concave strip mirror, said linear field being arranged substantially at the focal distance from said first concave strip mirror, said mirror being disposed so as to extend optically parallel to the field, and a second concave strip mirror, said first mirror reflecting the incident light from said field to said second concave strip mirror, said second mirror being optically parallel with the first mirror and forming therewith a substantially telecentric system and reflecting the incident light to the peripheral surface of the rod light guide, and a stepped mirror system carried by said light guide on that side of its periphery diametrically opposite the incident light, said stepped mirror system reflecting back, at angles of total reflection in the rod, incident light which strikes substantially perpendicularly to the axis of the rod.

4,116,528

OPTICAL VIEWING DEVICE OF THE PERISCOPE TYPE WITH ROTATING MEANS FOR FOCUSSING

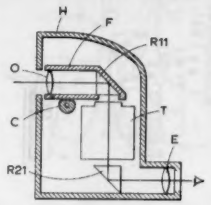
John A. Clarke, Carshalton, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 31, 1976, Ser. No. 672,250

Claims priority, application United Kingdom, Apr. 10, 1975, 14765/75

Int. Cl.² G02B *23/08, 23/12, 7/04*

U.S. Cl. 350—52 **7 Claims**



1. An optical viewing device comprising a fixed focal length objective, a periscopic reflector system, an eyepiece lens, said objective and said periscopic reflector system comprising a focussing and light redirecting system, and means for rotating at least one member of said focussing and light redirecting system along an arc sufficient to alter the optical path between said objective and said eyepiece lens for focussing said optical viewing device on a selected object within a predetermined range of short viewing distances and for correspondingly tilting the optical axis through the objective toward a line of sight between said eyepiece lens and said selected object.

4,116,529

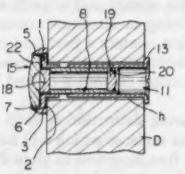
WIDE-ANGLE SPYGLASS

Takeyoshi Yamaguchi, 20-54, Tsurumaki, 5-chome, Setagaya-ku, Tokyo, Japan (154)

Filed Nov. 29, 1976, Ser. No. 745,697

Int. Cl.² G02B *7/02*

U.S. Cl. 350—69 **5 Claims**



1. A spyglass to be mounted in a door or the like for providing a wide-angle outdoor view comprising in combination:

an optical system including:

a wide-angle lens of a relatively large diameter and having on one side thereof a convex surface of a relatively large radius of curvature and on another side thereof an opposing concave surface of a smaller radius of curvature than said convex surface for converging incoming light of substantially 180° outdoor sight at a large rate,

an objective of smaller diameter than said lens and having a concave surface on a side thereof abutting coaxially against said other side of said lens containing said first-named concave surface, for collimating said converged light into a relatively small confined diameter, and

an eyepiece of smaller diameter than said lens and having a convex surface disposed coaxially with said objective and spaced therefrom for magnifying said collimated light to provide a normal view of said substantially 180° outdoor sight,

means for securing said lens, objective, and eyepiece relative to one another, said securing means comprising:

a substantially cylindrical portion of smaller diameter than said lens for closely enclosing said collimated light of confined diameter and including a first end securing said objective and a second end spaced axially from said first end for securing said eyepiece, and

an enlarged portion at the first end for securing said large diameter lens,

means for mounting said securing means including the optical system to the door or the like presenting said magnified view to the interior of the door or the like, said mounting means comprising:

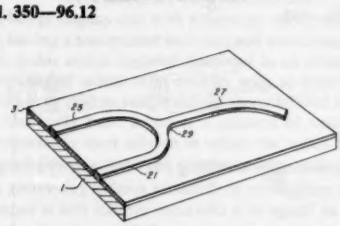
a cylindrical member of smaller diameter than said lens and including one end attached to said second end of said cylindrical portion, and another end having a flange for engaging the door or the like so that one side of the door or the like is gripped by said enlarged portion and the other side of the door or the like is gripped by said flange.

4,116,530

OPTICAL WAVEGUIDES GROWN BY SELECTIVE LIQUID PHASE EPITAXY

David W. Bellavance, Dallas, Tex., and Joe C. Campbell, Highlands, N.J., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 29, 1976, Ser. No. 709,554
Int. Cl.² G02B 5/14
U.S. Cl. 350—96.12 **11 Claims**



1. An epitaxially grown arcuate optical waveguide comprising:

an arcuate semiconductor structure having a high index of refraction for guiding light, said structure having a radius of curvature in the range of about 25–125 mils, said structure having smooth side walls substantially free of faceting thereby preventing the scattering of light propagating therethrough into untrapped modes;

at least one semiconductor barrier layer of low refractive index in contact with said arcuate optical waveguide; and

a planarized semiconductor substrate for support of said arcuate optical waveguide.

4,116,531

FIBER OPTIC SWITCH ARRANGEMENT

John C. Greenwood, Harlow, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Apr. 1, 1977, Ser. No. 783,875
Int. Cl.² G02B 5/14
U.S. Cl. 350—96.20 **2 Claims**

1. An optical fibre matrix switch arrangement comprising:

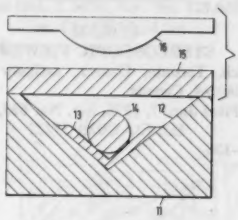
a rigid substrate having a flat surface;

a coating of relatively low refractive index material on said surface;

a substantially parallel array of light guides of a relatively high refractive index arranged on the coating, each of said light guides selectively coated along portions of its length with a protective layer of low index material;

an elastic diaphragm mounted adjacent the light guides; and

an array of bar members arranged substantially perpendicular to the light guides, each of said bar members being arranged relative to said selectively coated portions of the light guides so that depression of any one bar member distorts the diaphragm into contact with the light guides



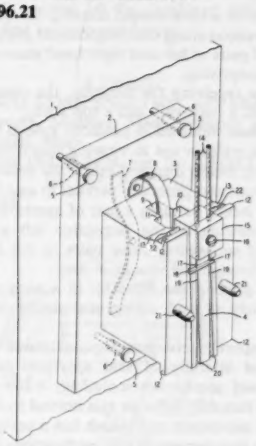
thereby attenuating light only in the guides that have no coating in the region of contact so as to provide an *n* out of *m* switch code.

4,116,532

FIBER POSITIONING AND CONNECTION METHOD AND APPARATUS

William Marshall Hubbard, Colts Neck, and Willis Martin Muska, Little Silver, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 5, 1977, Ser. No. 756,997
Int. Cl.² G02B 5/14
U.S. Cl. 350—96.21 **18 Claims**



1. A fiber positioner comprising:

fiber receptacle means having at least one groove extending from a precision positioning zone of each said groove to a capture zone of each said groove where each said groove is wider than at each said precision zone;

means for holding at least one fiber so that at least a portion of the length of each said fiber is respectively laterally exposable to each said groove; each said fiber portion being able to be respectively brought together with each said groove at each said capture zone, said receptacle means and said holding means having an initial orientation angle relative to one another; and

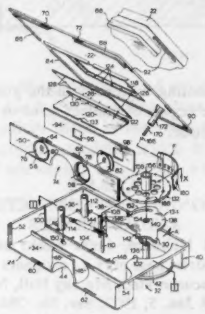
means for flexibly providing a positioning pressure so that as each said fiber portion is respectively brought together with each said groove at each said capture zone without bending of said fiber portion said relative orientation angle of said receptacle means and said holding means is automatically decreasable to essentially zero degrees, said pressure also serving to advance each said fiber portion in each said groove beginning with said capture zone and

reaching said precision positioning zone without the end face of each said fiber contacting any surface of said groove.

4,116,533
STEREOSCOPIC VIEWER

Gunter Nerlich, Toronto, Canada, assignor to Dimensional Products Limited, Canada

Filed Jun. 7, 1976, Ser. No. 693,408
Int. Cl.[2] G02B *27/22*
U.S. Cl. 350—135 **4 Claims**



1. A viewer for a stereoscopic filmstrip having a plurality of spaced perforations along one longitudinal margin and including a series of pairs of left and right hand stereoscopic frames, the viewer comprising:

a casing for receiving the filmstrip, the casing including a front wall, a rear wall, and a top wall;

a pair of lenses mounted in positions spaced transversely of said front wall for use in viewing said filmstrip;

film masking means disposed inside the casing at a position spaced from and generally parallel to said front wall, said masking means defining a pair of apertures positioned to permit viewing of the respective left and right hand frames of successive frame pairs as the filmstrip is advanced through the viewer in use;

means for guiding the filmstrip in a path which extends transversely of said casing rearwardly of the masking means;

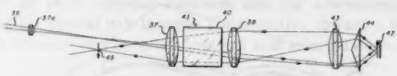
a film transport mechanism disposed inside the casing and positioned laterally of said apertures in the masking means, said mechanism including: a film-engaging disc which is turnable about an axis normal to the direction of filmstrip movement and which has a peripheral series of teeth for engagement in said perforations in the filmstrip so that turning of the disc advances the filmstrip past said apertures; a drive member for turning said disc, said member itself being turnable about an axis parallel to the turning axis of the disc and including an operating lever which projects to the exterior of the casing for turning the member and which is movable from a rest position to a fully advanced position; means biassing said drive member to normally maintain the operating lever in said rest position; ratchet means coupling said drive member and said disc and adapted, upon movement of the operating lever from said rest position to said fully advanced position to cause the said disc to turn unidirectionally through an angle subtended at the periphery of the disc by an arc of a length equal to the spacing between successive pairs of frames on said filmstrip; and a spring biassed detent coupled to said casing in a fixed position with respect to said disc, the disc having an upper surface formed with a plurality of recesses for receiving said detent and arranged so that, when the detent is engaged in one of said recesses, the disc is prevented from return movement in a direction counter to the film advance direction upon release of said operating lever and one of said pairs of frames in the filmstrip is in registration with the openings in the film masking means, said recesses being equally spaced about the axis of turning of the disc by an angle equal to said angle through which the disc turns, so that the detent engages in a succeeding one of of said recesses only when said operating lever is moved from said rest position to said fully advanced position to turn the disc fully through said angle, whereby the detent maintains registration of said frame pairs with the openings in the film masking means; and,

means for illuminating the filmstrip, said means comprising: at least one light admitting aperture in said top wall of the casing, said aperture being positioned rearwardly of said masking means; and reflector means arranged in an angular position at the rear of the film path for reflecting incoming light through said apertures in the masking means to illuminate the filmstrip.

4,116,534
APPARATUS AND METHOD FOR HIGH SPEED ACCESSING OF CHARACTER IMAGES

Donald H. McMahon, Carlisle, Mass., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Apr. 4, 1977, Ser. No. 784,087
Int. Cl.[2] G03B *27/16;* B02B *27/17*
U.S. Cl. 350—157 **26 Claims**



1. An apparatus for accessing one character symbol generator from a multiplicity of character symbol generators and for providing an image of a character symbol that is represented by said accessed one character symbol generator, at a predetermined fixed position that is independent of said one character symbol generator accessed, comprising:

means for emitting a light beam from a second end thereof in response to a light beam from an external source that is incident to a first end thereof at a first deviation angle thereto, and for emitting a light beam from said first end at a second deviation angle thereto, differing from said first deviation angle, in response to a light beam incident to said second end;

means for deflecting a light beam incident thereto from said second end of said deviation means in a direction determined by a selected angle of deflection corresponding to said one character symbol generator and for deflecting a light beam incident thereto from said direction to said second end of said deviation means;

means for emitting a substantially collimated light beam, having predetermined beam dimensions, in response to said light beam deflected from said deflector means; and

character generating means having a multiplicity of character generators, each of dimensions substantially equal to said predetermined beam dimensions, one of which, that corresponds to said one character symbol generator, is illuminated by said light beam emitted from said collimating means, said illuminating beam being spatially modulated by said one character symbol generator and reflected therefrom to be incident to said collimating means wherefrom said spatially modulated beam illuminates said deflector and is deflected to said second end of said deviating means, emerging from said first end at said second deviation angle and focused at said predetermined fixed position that is independent of said one character symbol generator accessed.

4,116,535

PICTURE DISPLAY CELL WITH MEMORY EFFECT

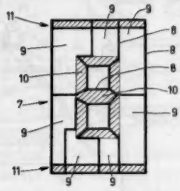
Johannes Jacobus Ponjeé, and Jacob Bruinink, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 28, 1976, Ser. No. 736,485

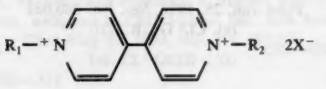
Claims priority, application Netherlands, May 10, 1976, 7604954; Oct. 12, 1976, 7611240

Int. Cl.[2] G02F *1/23;* G03G *16/00;* C09K *3/00*

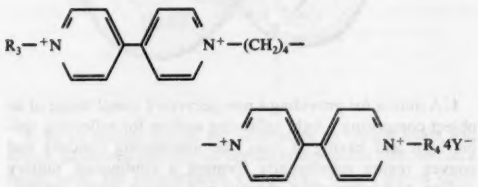
U.S. Cl. 350—355 6 Claims



1. An image display cell with a memory effect comprising a housing having a transparent wall part and containing a reversible reduceable redox material dissolved in an electro-chemically inert liquid which is in contact with at least two inert electrodes provided in said housing, characterized in that the electrochemically inert liquid is a mixture of water and an electrochemically inert solvent in which the redox material is a 4,4'-bipyridinium compound corresponding to the formula I



wherein R_1 and R_2 each represent an alkyl group having 4–8 carbon atoms and X^- is a ClO_4', NO_3', H_2PO_4' or BF_4' group, or a bipyridinium dimeric compound which corresponds to the formula II



wherein R_3 and R_4 each represent an alkyl group having 1–4 carbon atoms or a benzyl group which may be substituted with an electrochemically inert substituent, and Y^- is a ClO_4', BF_4', H_2PO_4' or PF_6' group, or a bipyridinium polymeric compound which is obtained by reacting 4,4'-bipyridyl and α,ω-dibromobutane in a polar aprotic solvent and then replacing the bromide anion by a ClO_4' ion, H_2PO_4' ion or BF_4' ion the combination of said mixture of water and solvent and redox material being such that said redox material when in reduced form is colored and insoluble in said mixture of water and solvent.

4,116,536

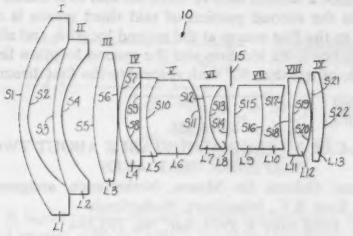
WIDE ANGLE LENS

Jacob Moscovich, Hollywood, Calif., assignor to Vivitar Corporation, Santa Monica, Calif.

Filed Oct. 1, 1976, Ser. No. 728,649

Int. Cl.[2] G02B *11/34*

U.S. Cl. 350—214 18 Claims



1. A wide angle lens of the retrofocus type comprising from the object end to the image end a first negative group, a second negative group, a third positive group, a fourth negative group, a fifth positive group, a sixth negative group, a seventh positive group, an eighth positive group and a ninth positive group, said eighth and ninth groups having a combined equivalent focal length opposite in sign to and having an absolute value within 10 percent of the combined equivalent focal lengths of said first and second groups.

4,116,537

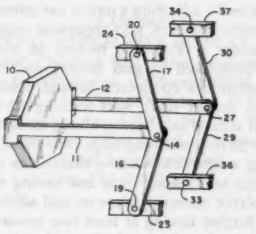
THERMAL COMPENSATION APPARATUS

Donald C. Dilworth, Medford, Mass., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 8, 1975, Ser. No. 620,512

Int. Cl.[2] G02B *7/02*

U.S. Cl. 350—253 5 Claims



1. Apparatus for moving optical means along a first direction and an opposite direction with respect to reference means in accordance with temperature variations to compensate for optical changes which may accompany the temperature variations comprising:

first means connected to the optical means so that movement of said first means is accompanied by movement of the optical means;

second means having a first portion connected to the reference means at a first location and having a second portion connected to said first means at a second location such that a line through the first location and the second location lies at an angle of other than 90° with respect to the first direction and the opposite direction, said second means being at least partly constructed of a material having a coefficient of thermal expansion such that the distance between the first location and the second location changes with the temperature variations to produce a first motive force on said first means; and

third means constraining the optical means to move in the first and opposite direction, said third means including a first portion connected to the reference means at a third location and a second portion connected to the first means and wherein said third means is at least partly constructed of a material having a coefficient of thermal expansion such that the distance between the third location and the second location changes with the temperature variations to produce a second motive force on said first means and wherein the second portion of said third means is connected to the first means at the second location and alined through the third location and the second location lies at an angle of less than 90° with respect to the first direction.

4,116,538

MOTOR-CAR MIRROR ADJUSTABLE ABOUT TWO PERPENDICULAR AXES

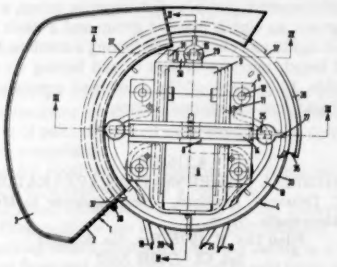
Aane Adriaan Oskam, De Meern, Netherlands, assignor to Industrie Koot B.V., Montfoort, Netherlands

Filed May 3, 1977, Ser. No. 793,354

Claims priority, application Netherlands, Jan. 10, 1977, 7700178

Int. Cl.² G02B *7/18*

U.S. Cl. 350—289 **5 Claims**



1. An apparatus for adjusting a motor car mirror around two mutually perpendicular axes, said apparatus comprises a housing having therein a reversible motor, an electromagnetic clutch means connected to said motor, and two planetary transmission assemblies connected to said clutch means and each having an output shaft, said housing further having a cylindrical wall around said motor, clutch means and transmission assemblies having a sealing edge thereon, a tilting adjusting ring having a spherical surface thereon in sliding sealing engagement with said sealing edge and having means thereon for holding a mirror mounting plate on said adjusting ring, said adjusting ring further having at least two inwardly extending dogs thereon extending inwardly from the circumference of said adjusting ring, said dogs being circumferentially spaced from each other by 90° and having recesses therein, and mirror adjusting members connected between the respective planetary transmission assemblies and the corresponding dogs and engaged in a snap fit in the recesses in said dogs for swiveling movement in said recesses, whereby the force for swiveling said adjusting ring is transmitted from said transmission assemblies to said adjusting ring adjacent the circumference of said adjusting ring.

4,116,539

MULTI-POSITION FOCUSING APPARATUS

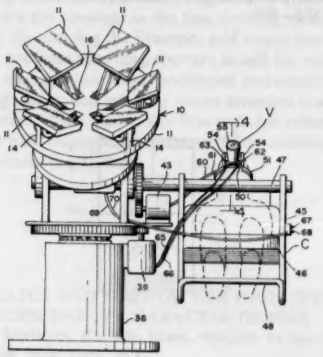
Ralph S. Evans, 1861 Inlet Dr., North Fort Myers, Fla. 33903

Filed Sep. 20, 1977, Ser. No. 834,827

Int. Cl.² G02B *5/08*

U.S. Cl. 350—292 **12 Claims**

1. A multi-position focusing apparatus comprising a plurality of article receiving members substantially symmetrically disposed with relation to each other about a centerline, first support means, first pivot means mounting each said member on said first support means for individual pivotal movement of said members in a different vertical plane passing through said centerline, second support means supporting said first support means, means operatively connecting said members for simultaneous pivotal movement thereof, second pivot means engaging said first support means and mounted on said second support means for simultaneous pivotal movement of said members in a vertical plane, third support means, third pivot means mounting said second support means on said third support means for swinging movement of said first and second support means about said third support means in a vertical plane, fourth support means supporting said third support means and fourth pivot means for rotating said third support means in a horizontal plane.



4,116,540

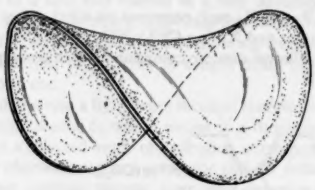
NON-PERVERTING MIRROR

David E. Thomas, 3205 Alcazar NE., Albuquerque, N. Mex. 87110

Filed Jun. 25, 1976, Ser. No. 700,051

Int. Cl.² G02B *5/10*

U.S. Cl. 350—293 **20 Claims**



1. A mirror for providing a non-perverted visual image of an object comprising a light reflecting surface for reflecting visible light and having at least one intersecting concave and convex region substantially forming a continuous, unitary surface, said intersecting concave and convex region substantially forming a section of a toroid.

4,116,541

PARABOLIC REFLECTOR WITH VARY TRANSVERSE WIDTH

Daniel Weiss, 239 Normandy Rd., Massapequa, N.Y. 11758

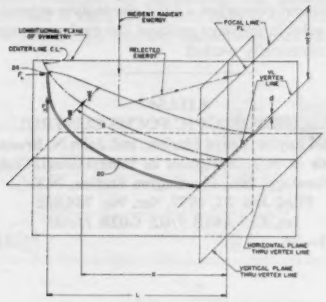
Filed Jul. 13, 1977, Ser. No. 815,182

Int. Cl.² G02B *5/10*

U.S. Cl. 350—296 **9 Claims**

1. A parabolic reflector made of pliable sheet material from a flat shield shaped blank of said material bent to form a curved

member, said blank having continuously varying transverse widths from end to end thereof and having a lobe terminating at a point at one end thereof, opposite lateral edges of said blank being oppositely curved from end to end thereof, said



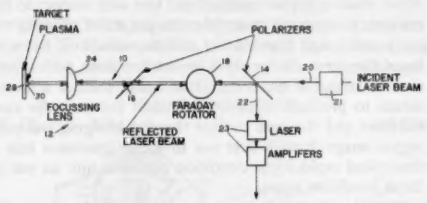
blank being symmetrical in form on opposite sides of a central longitudinal line thereof, said member having a parabolic curvature longitudinally from end to end thereof and being straight transversely between opposite lateral edged along the entire length of said member.

4,116,542

METHOD AND APPARATUS FOR REDUCING COHERENCE OF HIGH-POWER LASER BEAMS

Norman K. Moncur, and Frederick J. Mayer, both of Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.

Filed May 19, 1976, Ser. No. 687,927
Int. Cl.[2] G02B *0/00*
U.S. Cl. 350—321 **17 Claims**



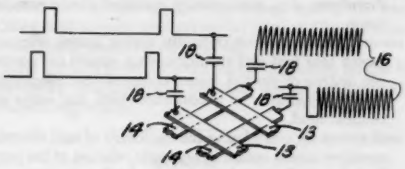
6. In an optical system for generating an output beam and which includes a plurality of optical components disposed on a beam path, the combination comprising target means composed of material which burns to form a beam-reflective plasma when irradiated by a beam having beam energy above an energy threshold, means disposed in said beam path among said system components to direct a beam traveling on said path from upstream system components onto said target means such that at least a portion of said target is burned to form a said reflective plasma and means disposed to redirect a beam portion reflected by said plasma to downstream system components to generate a said output beam, said target thereby isolating said downstream system components from said upstream system components for beams having beam energy below said threshold.

4,116,543

CONTROL ELECTRO-OPTICAL DEVICE UTILIZING LIQUID CRYSTAL

Charles R. Stein, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed May 3, 1971, Ser. No. 139,675
Int. Cl.[2] G02F *1/13*
U.S. Cl. 350—333 **5 Claims**



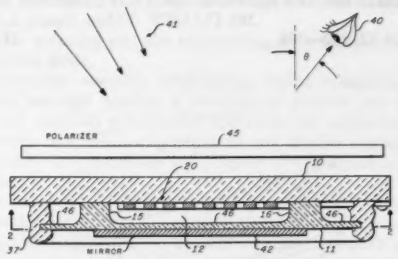
1. A liquid crystal display system comprising a thin layer of liquid crystal material which produces substantially no light scattering when in an unexcited state and a substantial amount of light scattering when in an excited state, a plurality of elongated conductors extending in parallel relation to each other on each side of the liquid crystal material with the conductors on one side extending orthogonally with respect to the conductors on the other side to provide a matrix of sites between opposed conductors, means for energizing all the conductors on one side of the liquid crystal material with a voltage having a frequency above the critical frequency of the liquid crystal material, means for simultaneously energizing successive ones of the plurality of conductors on the other side of said material during successive adjacent time periods with recurring voltage pulses having a frequency below the critical frequency and having a repetition rate in excess of that corresponding to the refresh time of the liquid crystal material, and means for removing the high frequency voltage from selected conductors on said one side of said material coincidentally with the application of the selected voltage pulses to conductors on the other side of said material to render selected sites light scattering.

4,116,544

LIQUID CRYSTAL REFLECTIVE DISPLAY APPARATUS

Richard A. Soref, Chestnut Hill, Mass., assignor to Beckman Instruments, Inc., Fullerton, California 92634

Continuation of Ser. No. 331,437, Feb. 12, 1973, abandoned.
This application Apr. 6, 1977, Ser. No. 785,009
The portion of the term of this patent subsequent to Apr. 30, 1991, has been disclaimed.
Int. Cl.[2] G02F *1/13*
U.S. Cl. 350—336 **4 Claims**



1. Electro-optical display apparatus comprising:
first and second coplanar optically transparent electrode means for forming an electric field between the coplanar electrodes;
first optically transparent plate means having first inner surface means,
said first and second coplanar optically transparent electrode

means supported on said first transparent plate in spaced substantially parallel cooperative relation,

optical circular polarization means spaced in substantially parallel relation with respect to the external surface means of said first optically transparent plate means,

second optically transparent plate means having second inner surface means,

mesa spacer means formed integrally with said second inner surface means for spacing said first inner surface means therefrom at a substantially constant predetermined distance,

electric field sensitive optically active means disposed between said first and second surface means for controlling the degree of optical transmission of said electro-optical display apparatus in accordance with the value of said electric field,

wall means for completing the enclosure of said electric field sensitive means sealed in hermetic relation at the peripheries of said first and second optically transparent plate means,

diffuse reflector means permanently affixed to the external surface of said second optically transparent plate means, and

said second optically transparent plate means bearing said diffuse reflector means being substantially thinner than the first of said optically transparent plate means so that said reflector means is relatively close to said coplanar electrode means for the purpose of substantially reducing parallax over a wide field of view.

4,116,545

POLYMERIC ELECTROLYTE FOR ELECTROCHROMIC DISPLAY DEVICES

Thomas Bradley Reddy, Pound Ridge, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed Oct. 27, 1976, Ser. No. 735,939
Int. Cl.[2] G02F *1/17*
U.S. Cl. 350—357 **3 Claims**

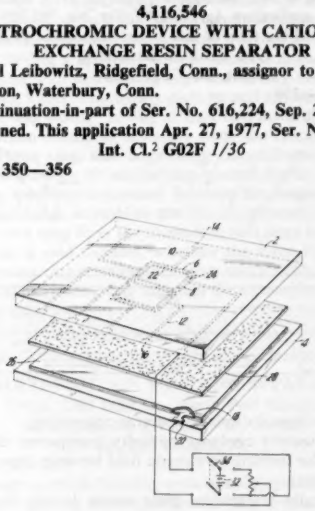
1. In an electrochromic variable light modulating device having an arrangement comprising a light transmitting substrate with a persistent electrochromic material as a light modulator and a counter-electrode separated from said substrate by an ion conducting material, an improved ion conducting material comprising an aqueous solution of polyethylene sulfonic acid which has been dehydrated to viscoelastic consistency.

4,116,546

ELECTROCHROMIC DEVICE WITH CATIONIC ION EXCHANGE RESIN SEPARATOR

Marshall Leibowitz, Ridgefield, Conn., assignor to Timex Corporation, Waterbury, Conn.

Continuation-in-part of Ser. No. 616,224, Sep. 24, 1975, abandoned. This application Apr. 27, 1977, Ser. No. 791,536
Int. Cl.[2] G02F *1/36*
U.S. Cl. 350—356 **12 Claims**



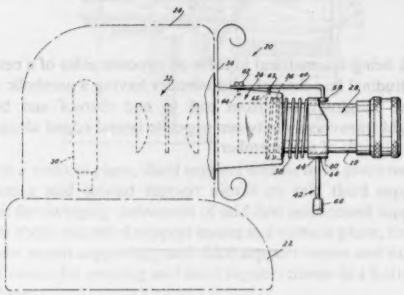
1. An electrochromic display device comprising in layered form, a first transparent substrate with a selectively actuatable transparent electrode thereon and a first electrochromic layer on said transparent electrode, a counterelectrode having a second electrochromic layer thereon, with an electrolyte-separator layer between said electrochromic layers, wherein the improvement comprises a solid electrolyte-separator comprised of a soluble polymer cationic ion exchange resin in the acid form, chemically wetted.

4,116,547

TACHISTOSCOPIC FOCUS CONTROL

Stanford Earl Taylor, Lloyd Harbor, and John N. Brucat, Floral Park, both of N.Y., assignors to Instructional/Communications Technology, Inc., Huntington Station, N.Y.

Filed Jan. 31, 1977, Ser. No. 764,062
Int. Cl.[2] A61B *3/02*; G02B *15/00*
U.S. Cl. 351—31 **24 Claims**



1. Apparatus for the tachistoscopic projection of an image from projectable material comprising:

a supporting structure;

a light source;

lens means on the supporting structure optically aligned with the light source;

means on the supporting structure for supporting the projectable material between the light source and the lens means;

cam means including a cam surface and a cam follower to effect relative displacement of said lens with respect to the stationary supported material to be projected to bring the projected image from an out of focus condition to an in focus condition for a rapid controlled time period and then to an out of focus condition again; manual actuator means to produce relative movement between the cam follower and the cam surface thereby bringing the projected image from a first out of focus condition into a controlled rapid focus condition and then into an out of focus condition again;

the manual actuator being a handle and being normally rotatable to a first position and releasable to rotate to a second position.

4,116,548

ADJUSTABLE SUPPORT

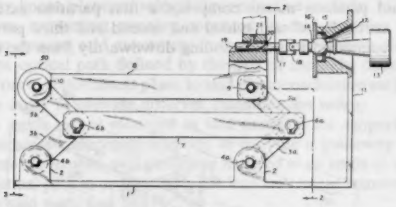
Staffan B. Persson, Kenmore, N.Y., assignor to American Optical Corporation, Southbridge, Mass.

Filed Mar. 2, 1977, Ser. No. 773,572
Int. Cl.[2] A61B *3/00*
U.S. Cl. 351—38 **10 Claims**

1. Apparatus for providing adjustment from a normal vertical position and a normal horizontal position of a device which comprises:

a support member, a plurality of interconnected first and second link members, each of said first and second links having a pair of parallel pivot axes, one pivot axis of each

first link and one pivot axis of the interconnected second link being a common pivot axis interconnecting said first and second links, each of said second links being connected to said support at the other second link pivot axis, a frame member for supporting said device pivotably connected to each of said first links at the other first link pivot axis, a rigid member connecting each said common



pivot axis for maintaining parallelinity between said support member and said frame member, torsion means connected to a link for substantially counterbalancing said device at said normal vertical position and positioning means connected to said support for selectively moving said device.

8. The apparatus according to claim 1 wherein the device is an ophthalmic instrument.

4,116,549

CONTACT LENS

James E. Harris, Rte. 2, Amity Heights, Bristol, Tenn. 37620, and Ben D. Parish, Box 758, Greeneville, Tenn. 37743

Filed Jan. 12, 1976, Ser. No. 648,011
Int. Cl.[2] G02C *7/04*
U.S. Cl. 351—160 **3 Claims**

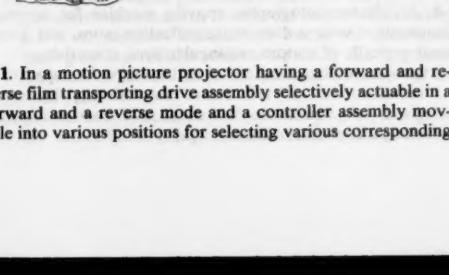
3. A contact lens comprised of an organic cellulose ester selected from the group consisting of cellulose acetate, cellulose acetate butyrate and cellulose acetate propionate, the contact lens characterized by a warpage tolerance not greater than 0.10 mm provided by an antiwarpage treatment wherein the lens material is exposed to an elevated temperature for a predetermined length of time prior to machining and grinding.

4,116,550

PROJECTOR RESET-AUTO STOP MECHANISM

Raymond W. H. Kim, Skokie, and Edward R. Prelletz, Chicago, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Feb. 18, 1977, Ser. No. 770,256
Int. Cl.[2] G03B *23/00*
U.S. Cl. 352—124 **18 Claims**



1. In a motion picture projector having a forward and reverse film transporting drive assembly selectively actuable in a forward and a reverse mode and a controller assembly movable into various positions for selecting various corresponding operating modes, a control mechanism to selectively cease film transport comprising:

means for sensing a predetermined film tension condition in at least one film transporting mode;

means actuated by said controller assembly for establishing a reset condition in which the projector is conditioned to sense said predetermined film tension condition; and

means selectively responsive to said tension sensing means in selected ones of said various operational modes for transmitting said sensed predetermined tension film condition to said reset condition establishing means,

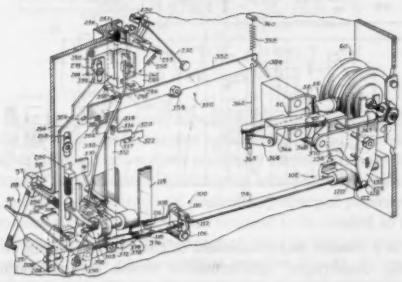
said reset condition establishing means including means for positioning said controller assembly to cease normal film transporting action.

4,116,551

PROJECTOR AUTO REWIND MECHANISM

Raymond W. H. Kim, Skokie; Arthur L. Lueders, Mundelein; Edward R. Prelletz, and Gerald D. Warden, both of Chicago, all of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Feb. 18, 1977, Ser. No. 770,257
Int. Cl.[2] G03B *23/00*
U.S. Cl. 352—124 **14 Claims**



1. In a motion picture projector having a forward and reverse film transporting drive assembly selectively actuable in at least a forward and a reverse mode, an assembly for sensing a predetermined film tension condition and a controller assembly for selecting various operating modes, a control mechanism for selectively actuating a reverse mode of operation upon the occurrence of the predetermined film tension condition comprising:

means responsive to said tension sensing assembly in a first predetermined projector operating mode for conditioning said controller assembly to a second predetermined operating mode when said predetermined film tension condition is sensed; and

means for actuating said film transporting drive assembly in a reverse mode,

said controller assembly conditioning means comprising means movable between a first sensing position and a second operated position for operating said controller assembly and means responsive to said tension sensing assembly for controlling the position of said operating means,

said reverse mode actuating means being coupled to said operating means of said controller assembly conditioning means and responsive to actuate said film transporting drive assembly in the reverse mode upon said operating means moving from said first sensing position to said second operating position,

said film transporting drive assembly comprises a pivotable reverse drive actuating member which is displaced to actuate said drive assembly in a reverse mode,

the movement of said operating means from said first to said second position is a linear displacement, and

said reverse mode actuating means comprises means for

translating said linear displacement movement of said operating means to a rotational movement, means for coupling said rotational movement of said translating means and means coupled to said coupling means for displacing said pivotable reverse drive actuating member upon rotation of said translating means.

4,116,552

MOTION-PICTURE CAMERA WITH AUTOMATIC DIAPHRAGM CONTROL COMPENSATED FOR SHUTTER-SPEED VARIATIONS

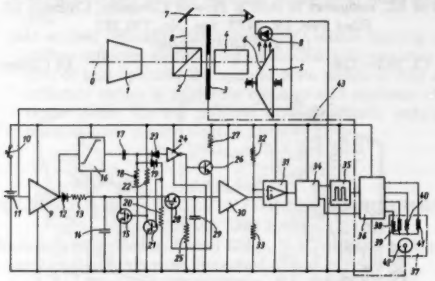
Eduard Wagensonner, Aschheim, Fed. Rep. of Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany

Filed May 23, 1977, Ser. No. 799,326

Claims priority, application Fed. Rep. of Germany, Jun. 26, 1976, 2628843

Int. Cl.² G03B *7/08*

U.S. Cl. 352—141 **11 Claims**



1. In a motion-picture camera of the type including an adjustable diaphragm, light-sensitive means for generating a light-indicating signal, and a shutter mechanism which alternately assumes an exposure-phase setting for effecting film exposure and a reflex-phase setting for reflecting incident scene light onto the light-sensitive means, in combination therewith, a novel automatic diaphragm adjustment arrangement comprising control-pulse-generating means operative for generating a first control pulse at the start of the reflex phase and a second control pulse at the end of the reflex phase; integrating means receiving the light-indicating signal and the first control pulse and operative in response to the latter for generating during the reflex phase an integral signal dependent upon the time integral of the light-indicating signal; signal-storing means; signal-transmitting means connecting the signal-storing means to the integrating means and receiving the second control pulse and operative in response to the latter for transmitting the integral signal from the integrating means to the signal-storing means; adjusting means for adjusting the diaphragm; and negative-feedback control means connected to the signal-storing means and to the adjusting means and operative for controlling the operation of the adjusting means as a function of the difference between the signal stored by the signal-storing means and a predetermined reference signal.

4,116,553

DISPLAY METHOD AND APPARATUS

Norman E. Cohen, and Hannah M. Cohen, both of 4709 Highview Blvd., Erie, Pa. 16509

Filed Jan. 21, 1977, Ser. No. 761,297

Int. Cl.² G03B *21/00*

U.S. Cl. 353—31 **5 Claims**

1. A display apparatus comprising,

a screen,

a light tunnel,

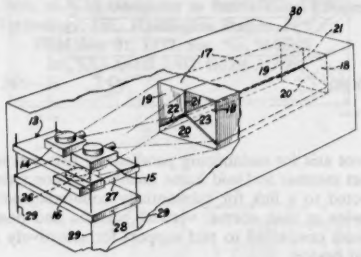
projector means,

said screen comprising a back lighted type screen adapted to fit the end of the said light tunnel in close-spaced relation,

said light tunnel comprising an enclosure open at the end adjacent to said projector means and open at the end adjacent to said screen,

said light tunnel comprising an enclosure divided into at least three distinct and separate light paths by partition means extending the full length of said tunnel,

said partition means comprises a first partition extending vertically of said tunnel and second and third partitions connected to and extending downwardly from the end of



said first partitions such that the three partitions form angles of 120 degrees with each other whereby said colors projected on said screen combine to form a three dimensional representation of a corner of a room with an area for floor, wall and drapery surfaces to enable the comparison of different combinations of colors and patterns.

said projector means being adapted to selectively direct at least three color images through said light paths,

said partitioned light paths divide the screen so that the images projected on the said screen look like the corner of a room with an area for floor, wall, drapery surfaces to enable the comparison of different colors and patterns.

4,116,554

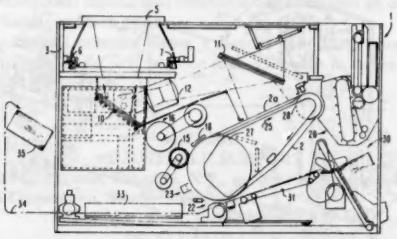
OPTICAL REDUCTION SYSTEM FEATURING THE PROVISION OF BORDERS

Edwin Langford Libby, Longmont, and Myrl J. Miller, Boulder, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 608,941, Aug. 29, 1975, which is a continuation of Ser. No. 301,681, Oct. 27, 1972, which is a continuation of Ser. No. 87,508, Nov. 6, 1970. This application Aug. 17, 1977, Ser. No. 825,337

Int. Cl.² G03G *15/00*

U.S. Cl. 355—11 **5 Claims**



1. An electrophotographic copying machine for copying documents at various discrete magnification ratios, said documents typically of various rectangular sizes, comprising:

a transparent plate mounted on said machine for supporting said documents of various sizes in a stationary document plane, said documents located on said document plane along a common reference edge;

flash lamp means for illuminating said document plane, mounted adjacent to said transparent plate;

a photoconductive surface mounted in said machine;

power means operatively connected to said photoconductive surface for moving said surface in said machine;

an optical system including a mirror element and a lens member, mounted in said machine for projecting light received from the illuminated document plane to a stationary image plane on said photoconductive surface;

a lens supporting member mounted in said machine for movement, said movement including a component along the optical path defined by the axis of the light directed from said document plane to said photoconductive surface in order to provide different magnification ratios;

lens guide means mounted in said machine for supporting said lens supporting member, to provide a guideway for lens movement, said guideway inclined at an angle to said optical path in order to provide lens movement transverse to said path; and

drive means operatively connected to said lens supporting member to move said lens supporting member to a first position to produce a first image in an image area sized approximately the same as a first document area, and to move said lens supporting member to a second position to produce a reduced second image, said lens guide means and said drive means cooperating to shift said second image within said image area to produce borders along opposite edges of said second image, said lens guide means and said drive means further cooperating to shift said second image without deliberately causing the center of said second image to coincide with the center of said first image.

4,116,555

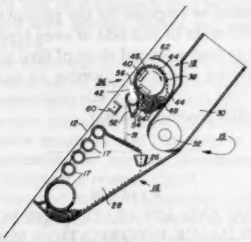
BACKGROUND REMOVAL APPARATUS

Eugene F. Young, Henrietta; Curtis M. Ray, Rochester, and Ryland F. Rogers, Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 626,678, Oct. 29, 1975, abandoned, which is a continuation of Ser. No. 508,954, Sep. 25, 1974, abandoned. This application Jan. 31, 1977, Ser. No. 764,101

Int. Cl.[2] G03G *21/00*

U.S. Cl. 355—15 **6 Claims**



6. Apparatus for removing toner particles from a photoreceptor, the apparatus comprising:

(a) transport means for transporting magnetic carrier beads into sweeping contact with the photoreceptor, and means for electrically biasing the transport means to a polarity and magnitude sufficient to assist in removing the toner particles from the photoreceptor and onto the carrier beads;

(b) first reclaim means positioned adjacent to the path of the transport means so as to contact the carrier beads having the toner particles thereon and means for electrically biasing the first reclaim means to a polarity and magnitude sufficient to remove the toner particles from the carrier beads; and

(c) means for at least substantially discharging any charge on the carrier beads after the carrier beads contact the first reclaim means but before the carrier beads contact the photoreceptor.

4,116,556

ELECTROPHOTOGRAPHIC COPYING APPARATUS

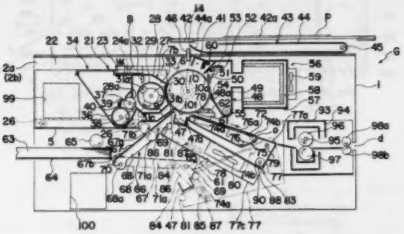
Susumu Tanaka, Sakai; Masaya Ogawa, Osaka; Hidetoshi Kawabata, Tondabayashi; Takao Fujiwara, Sakai; Takaji Kurita, Kawachinagano; Yuji Enoguchi, Osaka; Kenichi Wada, and Hiroshi Murasaki, both of Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 9, 1976, Ser. No. 749,083

Claims priority, application Japan, Dec. 19, 1975, 50/152534

Int. Cl.[2] G03G *15/00*; B65H *5/02*

U.S. Cl. 355—3 SH **7 Claims**



1. In an electrophotographic copying apparatus which has at least a movable photoreceptor member having a photoreceptor layer disposed on an outer periphery thereof, corona charging means for preliminarily charging said photoreceptor surface, means for exposing said preliminary charged photoreceptor surface to light images of an original to be copied so as to form images corresponding to said original on said photoreceptor surface as said photoreceptor member moves, means for transferring said images corresponding to said original onto said transfer material, and means for fixing said images corresponding to said original onto said transfer material for obtaining copied images of said original on said transfer material, the improvement which comprises:

a first transporting means for transporting said transfer material from a feeding means against said photoreceptor surface and between said photoreceptor surface and said transferring means and having an elongated transfer material supporting means extending toward said photoreceptor surface, said first transporting means being pivotally mounted at the end remote from said photoreceptor surface and having a free end adjacent said photoreceptor surface retractable away from and movable toward said photoreceptor surface;

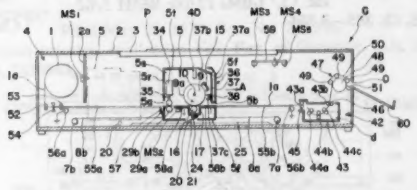
a second transporting means for transporting said transfer material from between said photoreceptor surface and said transferring means to said fixing means and having an elongated transfer material supporting means extending away from said photoreceptor surface, said second transporting means being pivotally mounted at the end remote from said photoreceptor surface and having a free end adjacent said photoreceptor surface retractable away from and movable toward said photoreceptor surface, said first and second transporting means being associated with each other for forming a path for the transfer material from said feeding means to said fixing means; and

connecting means connecting said first transporting means with said second transporting means for moving the free ends of said first and second transporting means in association with each other during retraction from said photoreceptor surface for providing space along said path of said transfer material within said copying apparatus for facilitation of removal of jammed transfer material.

4,116,557
ELECTROPHOTOGRAPHIC COPYING APPARATUS

Teizo Kushima, Osaka; Takaji Kurita, Kawachinagano, and Hiroaki Mizunoe, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 21, 1976, Ser. No. 753,088
Claims priority, application Japan, Dec. 27, 1975, 51/156506
Int. Cl.[2] G03G *15/28*
U.S. Cl. 355—8 12 Claims



1. An electrophotographic copying apparatus of the slit exposure type which comprises;

a platform member of transparent material disposed at an upper face of said copying apparatus for holding an original to be copied on said platform member;

a scanning frame member which includes therein at least a photoreceptor of cylindrical configuration having the photoreceptor surface on the outer periphery thereof, corona charging means for preliminarily charging the photoreceptor surface, an optical system for projecting a light image of the original onto the preliminarily charged photoreceptor surface for forming an image corresponding to the original on the photoreceptor surface, and means for transferring said image corresponding to the original onto a transfer material, said scanning frame member being movably disposed in said copying apparatus for reciprocation at a predetermined speed in a direction parallel to said platform member for scanning the original for forming said image corresponding to the original on said photoreceptor surface;

means for moving said scanning frame member from a scanning starting position in one direction for advancing the scanning frame member at the predetermined speed in a direction parallel to said transparent platform and from a scanning terminating position in the other direction for returning the scanning frame member to the starting position after termination of the scanning;

means for rotating said photoreceptor in association with the movement of said scanning frame member;

means for transporting the transfer material between said photoreceptor and said transfer means in the direction of the advancing of said scanning frame member at a speed equivalent to the sum of the speed of the advancing of said scanning frame member and the circumferential speed of rotation of said photoreceptor; and

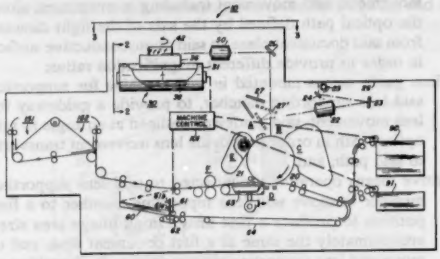
means for guiding the transfer material between the scanning starting position and the scanning terminating position of said scanning frame member;

whereby said transfer material is transported for transfer of said image formed on said photoreceptor thereonto as it is transported at said speed which is the sum of the speed of advancing of said scanning frame member and the circumferential speed of rotation of said photoreceptor.

4,116,558
DUPLEX SYSTEM AND METHOD FOR PRE-COLLATION COPIERS

John A. Adamek, Rochester, and Richard T. Ziehm, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 9, 1977, Ser. No. 767,012
Int. Cl.[2] G03B *27/32*
U.S. Cl. 355—24 23 Claims



1. A method of reproducing pre-collated sets of sheets of page images comprising the steps of:

(a) providing a means for forming a page image on a sheet of final support material;

(b) presenting serially to said imaging means a plurality of page images arranged in a desired sequential order wherein page images arranged at an odd position in said order comprise odd type page images and page images arranged at an even position in said order comprise even type page images;

(c) providing first means for feeding first sheets of final support material from a first supply thereof;

(d) providing second means for feeding second sheets of final support material from a second supply thereof; and

(e) actuating in response to the presentation of a page image of one of said odd or even types to said imaging means said first feeding means to feed a first sheet of final support material to said imaging means for forming an image of one type of page image thereon and actuating a second feeding means in response to the presentation of a page image of the other of said odd or even types to said imaging means to feed a second sheet of final support material to said imaging means for forming an image thereon of said other type page image while continuing to feed sheets from said first feeding means.

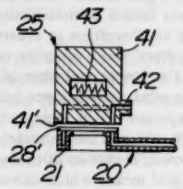
4,116,559
PROCESS OF AND APPARATUS FOR FORMING A PICTURE IMAGE INFORMATION SUCH AS A MANUSCRIPT, ETC. ON A DRY TREATED FILM AND DEVELOPING THE SAME

Tadashi Morokuma, Tokyo, and Ryo Fujimori, Hachioji, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 19, 1977, Ser. No. 798,613
Claims priority, application Japan, May 26, 1976, 51/59939; May 26, 1976, 51/59940; May 26, 1976, 51/59941
Int. Cl.[2] G03B *29/00;* G03C *5/24*
U.S. Cl. 355—28 16 Claims

1. A method of forming a picture image information on a dry treated roll film and developing the same, comprising the steps of: cutting said dry treated roll film into a portion having a given length, exposing said roll film portion to light reflected back from said picture image information and forming said picture image information thereon, hot developing said picture image information formed on said film segment under a flat state without applying tension thereto by attracting said film

segment onto a heating block, said successive steps being carried out by attracting and holding said film segment on respec-



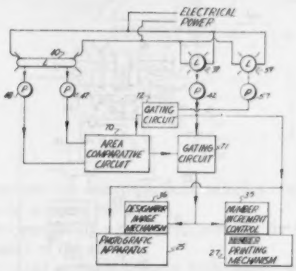
tive treatment blocks and carrying said film segment along a path.

4,116,560

APPARATUS AND METHOD FOR DOCUMENT MICROFILMING SYSTEM

James J. Dragani, Columbus, and David S. Wise, Solon, both of Ohio, assignors to James J. Dragani, Columbus, Ohio

Filed Jun. 6, 1977, Ser. No. 804,011
Int. Cl.² G03B *27/52, 27/32*
U.S. Cl. 355—41 **31 Claims**



1. A microfilming system for information retrieval to photographically record sets of documents that include a primary document provided with specific indicia and associated subdocuments comprising

(a) photographic apparatus for forming on a strip of photographic film an image of documents transported in serially spaced sequence past an imaging station, said photographic apparatus including means for forming an identifying designator image on said film strip in proximately disposed relationship to selected document images in response to receipt of a control signal,

(b) document transport means engageable with the documents to be photographed and operable to serially convey the documents in longitudinally sequential relationship through said photographic apparatus,

(c) identifier imprinting means disposed in operative relationship to said document transport means to imprint an identifier on each of the transported documents, said imprinting means including indexing means operable to increment said imprinting means to a next successive identifier in response to receipt of a control signal, and

(d) control means including

(1) first sensing means responsive to passage of a leading edge of a document past a first sensing station for generating a first electrical signal which is applied to said identifier imprinting means to effect actuation thereof and imprint the document with the identifier,

(2) second sensing means responsive to the specific indicia carried by only primary documents of a set for generating a second electrical signal in response thereto, and

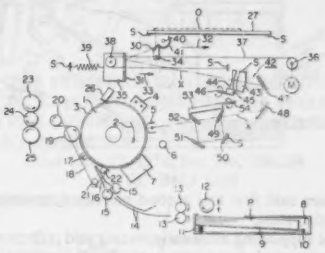
(3) circuit means responsive to concurrent generation of first and a second elecrtrical signals with respect to a primary document to form a control signal operative to actuate said identifying designator image forming means and index said identifier imprinting means.

4,116,561

COPYING APPARATUS

Wilhelm Knechtel, Biebertal, and Taisuke Tokiwa, Fernwald, both of Fed. Rep. of Germany, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 10, 1977, Ser. No. 805,564
Claims priority, application Fed. Rep. of Germany, Jun. 16, 1976, 2620917
Int. Cl.² G03B *27/34*
U.S. Cl. 355—57 **24 Claims**



1. A copying apparatus having a variable copying magnification, comprising:

means for supporting an object to be copied;

a photosensitive medium;

focusing lens means for projecting the optical image of said object upon said photosensitive medium, said focusing lens means having a main lens positionally fixed in the optical path between the support means and the photosensitive medium, and a movable auxiliary lens movable into and out of said optical path; and

a group of mirrors movable into and out of one of the optical path portions between said focusing lens means and said support means and between said focusing lens means and said photosensitive medium, thereby adjusting the length of said one optical path.

4,116,562

OPTICAL SYSTEM FEATURING CHANGE IN MAGNIFICATION BY COMBINED LENS AND MIRROR MOTION

Edwin L. Libby, Longmont, and Myrl J. Miller, Boulder, both of Colo., assignors to International Business Machines, Armonk, N.Y.

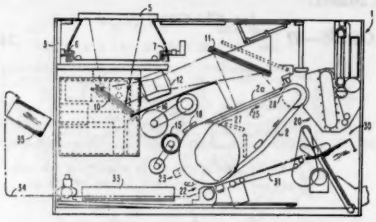
Continuation of Ser. No. 301,681, Oct. 27, 1972, abandoned, which is a continuation of Ser. No. 87,508, Nov. 6, 1970, abandoned. This application Aug. 29, 1975, Ser. No. 608,941
Int. Cl.² G03B *27/70*; G03G *15/26*
U.S. Cl. 355—60 **16 Claims**

1. A copier system incorporating at least a lens element and a reflector member and enabling the positioning on a document plane of documents within a predetermined size range from largest to smallest at a reference corner established by the intersection of two preselected intersecting reference edges of said documents positioned in said document plane, providing for at least one magnification mode change for projection of images of said documents from said document plane to an image plane, and maintaining a common reference corner in said image plane for images projected, comprising:

lens supporting means for supporting said lens element for movement substantially along the optical path of images transmitted in said system, the range of movement of said lens element being between at least a first position and a

second position to thereby effect change in magnification of images projected in said system, said supporting means being further arranged to concurrently impart a movement of said lens element transversely with respect to said optical bath as it moves between said first position and said second position, the extent of transverse movement of said lens element being of sufficient range to insure projection of images in said system in a constant relationship with respect to said image plane common reference corner for all documents of largest to smallest size;

first driving means for moving said lens supporting means and said lens element on a selective basis as required



between said first and second positions during operation of said system;

reflector supporting means supporting said reflector member in working relation in the optical path established in said system, said reflector supporting means being movable between first and second positions in conjunction with changes in magnification of images transmitted in said system; and

second driving means operable to drive said reflector supporting means and said reflector member concurrently with driving of said lens supporting means and said lens element by said first driving means.

4,116,563

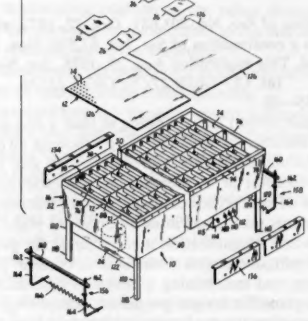
PATTERN REPRODUCTION TABLE

William Kaufman, 4 Stonehurst Ct., Pomona, N.Y. 10970

Continuation-in-part of Ser. No. 660,829, Feb. 24, 1976, abandoned. This application Sep. 2, 1977, Ser. No. 830,020

Int. Cl.[2] A47B *13/00*; G03B *27/20*

U.S. Cl. 355—91 **14 Claims**



1. A pattern reproduction table comprising an enclosure having a top open end, thin metal highly light reflecting criss-cross shaped grid means mounted across the said top open end of said enclosure and spaced above the lower end thereof, a flexible transparent air-permeable sheet of thin film material overlying said grid means and initially supported thereby by upper surfaces of said grid means which extend in a first direction, vacuum blower means communicating with said enclosure for exhausting air therefrom to create a suction through said air-permeable sheet, and a plurality of lamps mounted in said enclosure at the lower end thereof beneath said grid means, and spaced a substantial distance below said grid means, said flexible transparent sheet being drawn downwardly through openings in said grid means under the suction created by said vacuum blower means so as to engage the upper surfaces of all of said grid means which extend in said first direction and form downwardly bowed undulations therebetween, thereby presenting a sinuous shape in cross-section.

4,116,564

APPARATUS FOR THE STUDY OF PLASMAS

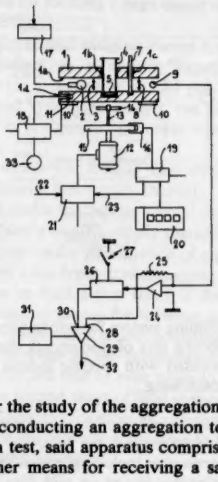
Serge Renaud, and Jean-Paul Rubel, both of Bron, France, assignors to Institut National de la Sante et de la Recherche Medicale Inserm, Paris, France

Filed Feb. 5, 1976, Ser. No. 655,394

Claims priority, application France, Feb. 12, 1975, 75 04904

Int. Cl.[2] G01N *21/00*; G01J *3/48*; G01N *21/24*

U.S. Cl. 356—39 **5 Claims**



1. An apparatus for the study of the aggregation and coagulation of plasmas by conducting an aggregation test and conducting a coagulation test, said apparatus comprising:

transparent container means for receiving a sample to be studied;

means for maintaining said container means and said received sample at a predetermined constant temperature;

light source means for generating a beam of light of constant intensity and for directing same towards said container means to cause same to pass through said received sample;

rotatable stirrer means disposed within said container means for acting on said received sample;

means for selectively rotating said stirrer means at two different constant speeds, namely a first speed of substantially 1100 rpm for an aggregation test and a second speed of substantially 100 rpm for a coagulation test;

photo-electic means for receiving the light from said light source means which has passed through said container means and through said received sample and for delivering a signal in response thereto;

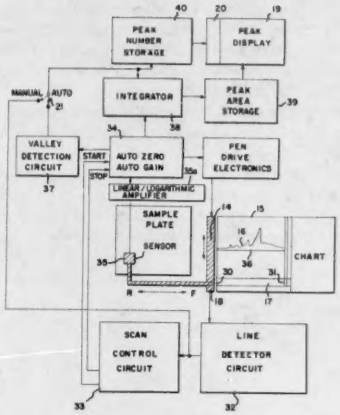
means between said light source means and said photo-electric means for selectively receiving one of two different optical filters, namely a first one having a wave length of substantially 530μ (green) for an aggregation test and a second one having a wave length substantially from 360 to 400μ (violet) for a coagulation test;

means for deriving an outlet signal from the signal of said photo-electric means;
and means for zeroing the value of said outlet signal at the beginning of each test.

4,116,565
ELECTROPHORETIC ANALYZER WITH AUTOMATIC REFERENCE CIRCUIT

William E. Powell, and Richard G. Magner, both of Raleigh, N.C., assignors to Corning Glass Works, Corning, N.Y.

Filed May 24, 1977, Ser. No. 799,944
Int. Cl.[2] G01N *27/26*
U.S. Cl. 356—105 **9 Claims**

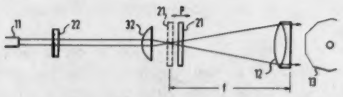


1. An analyzer for electrophoretic samples comprising:
a source of analysis energy,
a detector producing a signal representing the optical characteristics of the sample,
a sample stage movable linearly with respect to said source and said detector to scan a sample,
means for generating a voltage representing the minimum in said signal during a first scan of said sample stage, and
means for combining said voltage with said signal during a second scan of the said sample stage to automatically correct said signal to a reference.

4,116,566
LINE SCANNING DEVICE FOR DETECTING DEFECTS IN WEBS OF MATERIAL

Erwin Sick, Icking, Fed. Rep. of Germany, assignor to Erwin Sick Gesellschaft mit beschränkter Haftung Optik-Elektronik, Waldkirch, Fed. Rep. of Germany

Filed Nov. 3, 1976, Ser. No. 738,546
Claims priority, application Fed. Rep. of Germany, Nov. 12, 1975, 2550814
Int. Cl.[2] G01N *21/16*
U.S. Cl. 356—200 **22 Claims**

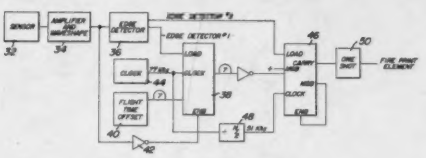


1. In a line scanning device for detecting defects in webs of material, wherein a laser light source throws a light spot by way of an objective, a light deflector device, and a cylindrical lens onto a web of material moving parallel to its surface, said light spot periodically scanning the web at right angles to the direction of its movement and parallel to its surface, and wherein a light receiving arrangement comprising a rod light guide having a first surface, a second surface opposite said first surface and having a longitudinal axis and at least one photoreceiver is disposed parallel to the web of material and to the direction of scanning; the improvement comprising a step mirror arrangement carried by said rod light guide along said first surface and parallel to said axis, on that side of its periphery lying opposite the light inlet to said guide, and comprising a plurality of mirrors inclined with respect to said longitudinal axis, and arranged substantially exactly one behind the other when looking in the direction of said axis such that light reflected by said mirrors impinges on said second surface at angles of total reflection, and a light-scattering cylindrical lens grid, the axes of whose lenses extend in the scanning direction, disposed between the light source and said objective.

4,116,567
PRINTER SYNCHRONIZATION CONTROL FOR SHUTTLE HAVING NON-UNIFORM VELOCITY

Craig San Pietro, Philadelphia, Pa., assignor to Okidata Corporation, Moorestown, N.J.

Filed Dec. 22, 1976, Ser. No. 756,339
Int. Cl.[2] B41J *3/04*
U.S. Cl. 400—124 **9 Claims**



1. In a dot matrix printer including a shuttle and plural print elements mounted thereon for printing dots at preselected positions on a paper, wherein the relative velocity between the paper and the shuttle is non-uniform and wherein each of the print elements strikes the paper a finite time *T*flight after having been actuated, a printer synchronization control comprising:
means for measuring the relative velocity between the paper and the shuttle over a period of time *T*inc inversely proportional to the relative velocity;
means for determining the time *T*dec at which a print element must be actuated to strike the paper at a preselected columnar position; and
means for causing the print element to strike the paper at said preselected position as a function of said time determining means.

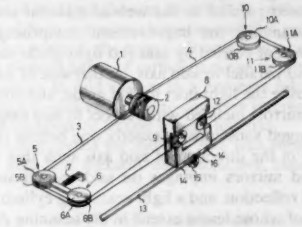
4,116,568
CARRIAGE DRIVING MECHANISM FOR PRINTER

Takami Suzuki; Masayuki Suzaki, both of Yokohama, and Tomoyuki Moriya, Atsugi, all of Japan, assignors to Ricoh Co., Ltd., Japan

Filed Apr. 4, 1977, Ser. No. 784,373
Claims priority, application Japan, Apr. 5, 1976, 51-37294
Int. Cl.[2] B41H *19/30*
U.S. Cl. 400—320 **8 Claims**

1. A carriage driving mechanism for a printer comprising: a driver motor, a drive pulley on said driver motor rotatable by said driver motor, at least one cable having two end portions connected adjacent each other to said drive pulley such that both end portions are wound or unwound simultaneously, said cable being folded near its center to form substantially equal and parallel first and second cable portions, at least one car-

riage pulley rotatably mounted on the carriage having the cable fold wrapped therearound so that the tension on said first



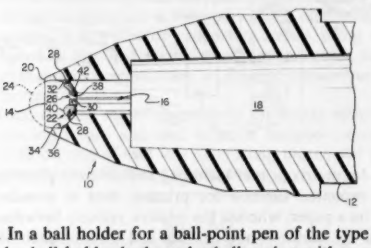
and second cable portions due to the driving of said drive pulley are at all times equal.

4,116,569

BALL HOLDER FOR A BALL-POINT PEN

Meuriel Francis Reed, North Reading, and Curtis Lawrence Malm, Quincy, both of Mass., assignors to The Gillette Company, Boston, Mass.

Filed Feb. 14, 1977, Ser. No. 768,479
Int. Cl.[2] B43K *7/10*
U.S. Cl. 401—216 **3 Claims**



1. In a ball holder for a ball-point pen of the type having a tubular ball holder body and a ball socket with a cylindrical wall on an end of said body for rotatable retention of a writing ball, an ink reservoir extending into said body and an ink reservoir seat port extending from said ball socket to said reservoir, the improvement comprising:

a ball seat at a bottom of said ball socket, said ball seat having a plurality of convex surfaces formed on concave shoulder surfaces to provide a single ball contact point on each of said convex surfaces;

concavities between said convex surfaces adjacent to said shoulder surfaces for collecting and supplying ink to a surface of said writing ball; and

linearly tapered capillary channels providing a first gap separating said adjacent shoulder portions bordering said ink seat port and a second smaller gap separating said adjacent shoulder portions at said ball socket wall.

4,116,570

TOOTHBRUSH WITH CARTRIDGE CHAMBER

Ronald Parenti, 231 Bryn Mawr Ave., Roselle, Ill. 60172

Filed Nov. 8, 1976, Ser. No. 739,618
Int. Cl.[2] A46B *11/04*
U.S. Cl. 401—155 **1 Claim**

1. A toothbrush and paste cartridge assembly comprising in combination

a toothbrush formed by a handle defined by an exterior wall and having a hollow interior, and terminating in a closed bristled portion at one end and being open at the opposed end thereof,

said wall of said toothbrush handle provided with an elongate slot extending the substantial length of said toothbrush,

said slot provided with a plurality of pusher positioning means positioned along the length thereof,

said pusher positioning means formed by a plurality of nibs positioned along and formed integrally with the lateral confines of said slot,

pusher means reciprocally carried on said toothbrush and adapted for travel along the length of said hollow interior of said toothbrush,

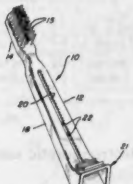
said pusher means formed by a pusher block sized and proportioned to be reciprocally movable within the confines of said hollow interior of said toothbrush handle,

an elongate rail mounted on said pusher block, said rail being sized and proportioned to slide within the confines of said slot,

said pusher means being further provided with pusher stop means in cooperating relation with said pusher positioning means provided in said slot thereby to permit positioning of said pusher means at a plurality of stop positions along the length of said toothbrush handle,

said pusher stop means formed by a stop boss carried on said rail and positioned to be in cooperative relation with said plurality of nibs whereby said stop boss is in frictional contact with said plurality of nibs thereby to effect a plurality of stop positions,

thumb grip means carried on said rail and extending, in use, beyond the confines of said slot thereby to provide a



gripping surface to facilitate reciprocation of said pusher block within said hollow interior of said toothbrush,

said hollow interior of said toothbrush handle including a chamfered section positioned adjacent said closed bristled end,

said chamfered section terminating in a nozzle section,

said nozzle section being disposed arcuately in the direction of and in open communication with said closed bristled portion of said toothbrush,

and a preformed and prefilled toothpaste cartridge constructed and sized for insertion and nesting within the hollow interior portion of said toothbrush handle,

said cartridge formed by an elongate body portion, a tapered neck portion adjacent the forward end thereof and said tapered neck portion terminating in a substantially flexible nozzle,

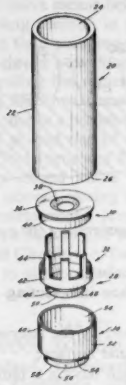
whereby said toothpaste cartridge is insertable within the hollow interior of said toothbrush handle with said tapered neck portion matingly nested within said chamfered section of said handle, and said nozzle positioned within said nozzle section of said toothbrush in open communication with said closed bristled portion of said toothbrush, and said pusher means being reciprocally positioned along the length of said slot to eject toothpaste from within said cartridge through said nozzle and into said bristled portion of said toothbrush.

4,116,571

DISPOSABLE FLUID DISPENSER

David Maxwell, 6035 Broadway, New York, N.Y. 10471

Continuation-in-part of Ser. No. 680,900, Apr. 27, 1976, abandoned. This application Nov. 17, 1976, Ser. No. 742,633
Int. Cl.[2] B43K *5/18;* B43M *11/06;* A47L *13/30*
U.S. Cl. 401—264 10 Claims



1. A dispenser for viscous liquids for personal use comprising; a hollow container having an opening at the forward end and means thereon to permit introduction of a supply of viscous liquid to the interior of the container, valve means adapted to be mounted on the container normally closing the opening in the container and adapted to be opened to release liquid, the valve means including a valve housing which is hollow and open at both ends, the housing adapted to be mounted in the opening in the container so that the passageway through the housing provides communication between the interior of the container and the exterior thereof, a valve seat formed in the housing, a valve piston movably mounted in the housing and shiftable between a position in engagement with the valve seat to close the opening at the forward end of the container and a position removed from the valve seat to permit the viscous liquid to flow from the container through the opening therein, spring means in the form of a plurality of substantially uniformly spaced stems extending rearwardly from the piston, spring retention means to engage with the stems and normally bias the spring stems to maintain the piston in engagement with the valve seat, and the piston in the seated position having an exposed portion extending beyond the housing whereby a predetermined application of force to the exposed portion will unseat the piston by applying a further bias to the spring stems and thereby permit the viscous liquid to flow from the container and, thereafter, release of the predetermined application of force will permit the piston to again seat and close the flow path from the container, and the spacing of the spring stems facilitating a uniform unseating of the piston and a consequent uniform flow of viscous liquid from the container.

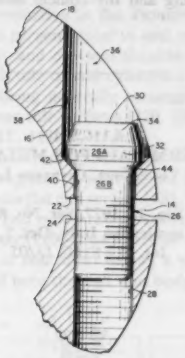
4,116,572

SHAFT CLAMPING DEVICE

Ernest J. Heldmann, Wethersfield, and Terry D. Capunno, New Britain, both of Conn., assignors to Veeder Industries Inc., Hartford, Conn.

Filed Jun. 6, 1977, Ser. No. 803,788
Int. Cl.[2] F16D *1/06*
U.S. Cl. 403—7 7 Claims

1. A shaft clamping device comprising a resilient annular collar for effecting a given holding power on a shaft of predetermined diameter and having a circular central opening and an outside collar diameter of reduced size in relation to a standard size specified for said given shaft holding power, the collar having a radial slot extending from the opening through an annular outer wall of the collar, the collar having a recess in its annular outer wall and a tapped opening coaxially aligned with the recess, the recess and tapped opening being respectively located on opposite sides of the radial slot and communicating therewith in perpendicular relation to the slot, the recess



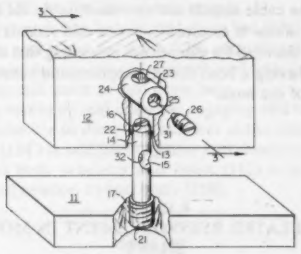
including an exposed entrance and a clamping screw clearance hole of reduced diameter relative to the entrance, the recess further including a tapered diameter surface defining a junction between the entrance of the recess and its clearance hole, the tapered diameter surface providing a clamping screw bearing shoulder effecting reduced stress concentration.

4,116,573

FASTENING

Lothar U. Fuchs, 262 Mill Rd., Chelmsford, Mass. 01824

Filed Mar. 28, 1977, Ser. No. 781,716
Int. Cl.[2] F16B *9/02*
U.S. Cl. 403—264 8 Claims



1. Fastening apparatus comprising, fastening rod means for fastening first and second members together formed with a conical opening near one end extending from at least one side of the fastening rod means to the center thereof and having connection means near another end thereof for connection to the second member,

set screw means formed with a conical end for being seated inside the first member and screwed into said conical opening for engagement with the surface around said conical opening for urging said fastening rod means in a direction toward said one end for fastening the first and second members together,

said conical opening extending across the center of said fastening rod means at least almost to the opposite side of said fastening rod means,

and set screw holder means formed with an internally threaded opening for accommodating said set screw means and a fastening rod opening extending through said set screw holder means for allowing movement of said

fastening rod means along the fastening rod means axis while restricting said movement of said fastening rod means orthogonal to the latter axis with said one end extending outside said set screw holder means for accommodating said fastening rod means and embracing said conical opening and the conical end of said set screw means.

4,116,574

CABLE TERMINALS FOR METAL CABLES

Camillo Pirovano, Via Spluga, Cernusco Lombardone (Como), Italy

Filed Sep. 22, 1977, Ser. No. 835,694
Claims priority, application Italy, Oct. 7, 1976, 28074 A/76
Int. Cl.[2] F16G *11/05*
U.S. Cl. 403—275 **4 Claims**

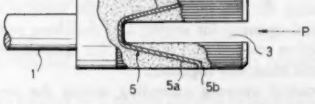
1. A cable terminal for metal cables, comprising a bush having an internally cylindrical bore flared internally at one end with an internal slightly conical part between the cylindrical part and the flared end, said bush mounted and locked on the cable, the cable strands are unwound inside the bush and a self-tapping screw is screwed between said strands in a direction axial to the bush for a depth not exceeding that of the bush, said screw having a head flared to correspond substantially to the flaring of the bush.

4,116,575

ENCAPSULATED REINFORCEMENT IN MOULDED SHAFT

Yoshio Nakatogawa, Miyagi, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Jul. 20, 1977, Ser. No. 817,179
Claims priority, application Japan, Jul. 20, 1976, 51-96311[U]
Int. Cl.[2] B25G *3/34*; F16B *17/00*
U.S. Cl. 403—265 **1 Claim**



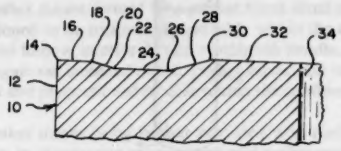
1. A coupling shaft used for electrical parts, made of molded material and provided with a slot along the axis of a coupling head characterized in that a resilient member is embedded in the shaft in such a manner that said slot is positioned in a valley formed by two arms of said resilient member.

4,116,576

CUTTING INSERT

William C. Gawryk, Sr., Allegheny County, Pa., assignor to Newcomer Products, Inc., Latrobe, Pa.

Filed Apr. 25, 1977, Ser. No. 790,175
Int. Cl.[2] B26D *1/00*
U.S. Cl. 407—114 **7 Claims**



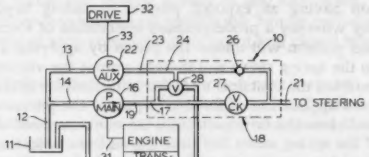
1. A cutting insert for controlling the removal of metal from a workpiece having:
(a) a peripheral wall surface;
(b) a planar land surface intersecting the peripheral wall surface;
(c) a cutting edge formed by the intersection of the peripheral wall and the planar surface;
(d) a first curved surface having a radius of from 0.006 to 0.018 inches adjoining and extending from the planar land surface;
(e) an inner wall surface descending from the first curved surface inwardly of the peripheral wall surface;
(f) a second curved surface descending from the inner wall surface and having a radius of from 0.006 to 0.018 inches; and
(g) a lower planar surface parallel to the planar land surface and adjoining and extending from the second curved surface thereby forming one continuous surface within the insert cutting edge.

4,116,577

FLOW SENSING AUXILIARY PUMP BY-PASS VALVE

John A. Lauck, Benton Harbor, Mich., assignor to National Machine Company, Inc., Stow, Ohio

Filed Mar. 21, 1977, Ser. No. 779,482
Int. Cl.[2] F04B *49/00*
U.S. Cl. 417—286 **7 Claims**



1. A valve for use in a system having a source of fluid, a first fluid pumping means operative by a driving mechanism and a second auxiliary fluid pumping means driven by a second driving mechanism and means responsive to a change in the flow condition of said fluid caused by a lack of proper performance of said first fluid pumping means to effect a utilization of the fluid pumped by said second fluid pumping means, said valve comprising:
means defining a body having a pair of inlet ports and an outlet port spaced from said inlet ports, said first pumping means being connectible in circuit with one of said pair of inlet ports, said second pumping means being connectible in circuit with the other one of said pair of inlet ports;
passageway means located in said body and between and in

fluid communication with said pair of inlet ports and said outlet port;

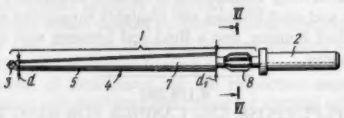
first normally closed valve means in said passageway means for controlling the main flow of fluid from said first pumping means to said outlet port and being openable in response to a predetermined pressure differential in said fluid at said one of said inlet ports and said outlet port, said normally closed valve means being closed, in addition to said normal closing thereof, in response to a fluid flow from said second fluid pumping means; and

second normally closed valve means in said passageway means for controlling the return flow of fluid from said second pumping means to a reservoir therefor and being openable in response to a predetermined pressure differential in said fluid at said one of said inlet ports and said outlet ports to effect a return of fluid to said reservoir, said second normally closed valve means being closed, in addition to said normal closing thereof, in response to a drop in said predetermined pressure differential in said fluid to effect (1) a blocking of the return flow of fluid to said reservoir and (2) a flow of fluid from said second fluid pumping means to said outlet port.

4,116,578
ROTARY TOOL FOR MAKING HOLES

Mikhail Lvovich Gelfand, Yaroslavskoe shosse, 129, kv. 44; Boris Grigorievich Goldshtein, ulitsa Molodogvardeiskaya, 24, korpus 1, kv. 26; Leonid Avrumovich Gornik, ulitsa Krasny Kazanets, 3, korpus 5, kv. 139, all of Moscow; Jury Pavlovich Shishulin, Jubileiny prospekt, 18, kv. 30, Khimki Moskovskoi oblasti; Yakov Isaakovich Tsipenjuk, ulitsa Kirova, 5, Solntsevo Moskovskoi oblasti, and Oleg Semenovich Tsygankov, bulvar Yana Rainisa, 14, kv. 94, korpus 2, Moscow, all of U.S.S.R.

Filed Feb. 11, 1977, Ser. No. 767,785
Int. Cl.[2] B23B *51/00*
U.S. Cl. 408—222 **4 Claims**



1. A rotary tool for making holes, comprising: a working part; a shank; said working part comprising at least two axial portions of which a first distal, portion is made with a profile of a twist drill for making a pilot hole, and a second portion, disposed axially between the first portion and said shank, made with a diameter increasing from the first portion towards said shank, whereby said pilot hole is enlarged after the tool enters it; said second portion having cutting teeth arranged along a varying pitch helical line in the second portion of said working part with the pitch increasing from the first portion towards said shank, the teeth having a height increasing towards said shank, a maximum pitch of the helical line being substantially smaller than a minimum diameter of the second portion, whereby self-feed of the tool in an axial direction is ensured.

4,116,579
END MILL TOOL HOLDER BODY AND TOOL

Martin Norman Hamilton, Middle Rd., R.R. #4, Meadville, Pa. 16335

Filed Aug. 25, 1976, Ser. No. 717,643
Int. Cl.[2] B23B *51/00*; B26D *1/00*
U.S. Cl. 408—233 **10 Claims**

1. In combination, a tool holder body (**110**), a draw bar (**115**), and a cutting insert (**111**) comprising,

an elongated generally cylindrical body (**110**) having a laterally and longitudinally extending slot (**112**) in one end thereof,

said slot (**112**) being defined by two flat surfaces (**112', 113'**) extending generally parallel to the central axis of said cylindrical body,

an axial cylindrical bore (**114**) of substantially uniform size in said body generally coaxial to the central axis of said cylindrical body (**110**) and extending parallel to the sides of said slot (**112**),

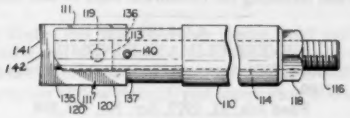
said slot (**112**) terminating in flat shoulders (**136, 137**) disposed generally perpendicular to said central axis of said cylindrical body and one said shoulder (**136, 137**) being disposed at each side of said cylindrical bore (**114**),

said insert (**111**) being generally rectangular in shape and having flat planar side surfaces (**120, 124**) resting on said flat surfaces (**112', 113'**),

a notch (**114'**) in one end of said insert,

said notch (**114'**) registering with an end of said cylindrical bore (**114**) and one flat end surface (**131, 132**) on said insert at each side of said notch resting on said shoulders (**136, 137**) on said body (**110**) at each side of said bore,

said notch (**114'**) in said insert having a width equal to the diameter of said bore through said body,



a draw bar (**115**),

said draw bar (**115**) having a diameter substantially equal to the diameter of said axial cylindrical bore (**114**) in said body and having a slot (**123**) in one end,

said slot (**123**) in said draw bar having flat side surfaces generally co-planar with and resting on said flat side surfaces of said insert (**111**),

said slot (**123**) in said draw bar receiving said insert,

the side edges of said notch (**114'**) in said insert (**111**) engaging the side edges of said draw bar (**115**) holding said insert (**111**) against lateral movement,

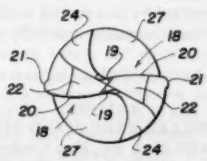
a laterally extending hole in said draw bar (**115**) and a hole (**130**) in said insert and a pin (**119**) extending through said hole in said draw bar and through said hole in said insert holding said insert to said draw bar,

retaining means on said draw bar engaging said body urging said draw bar to draw said surfaces at the sides of of said notch (**114'**) in said insert against said shoulders (**136, 137**) on said body whereby said insert (**111**) is held in rigid clamped relation to said body (**110**).

4,116,580
ALL CUTTING EDGE DRILL

Roy F. Hall, Overland, and Elmer C. Kramer, St. Louis County, both of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Apr. 8, 1977, Ser. No. 786,024
Int. Cl.[2] B23B *51/00*; B26D *1/12*
U.S. Cl. 408—230 **1 Claim**



1. In an all cutting edge drill comprising: an elongated generally cylindrical body formed with a cone shaped end and chip clearance flutes in the side of and extending spirally about the

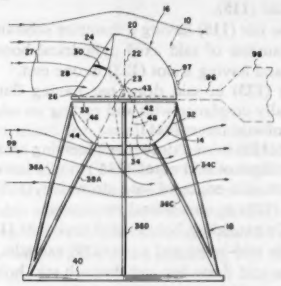
cylindrical body, said body having an axis of rotation passing through the apex of the cone shaped end; the improvement in which said cone shaped end includes at least two circumferentially spaced end surfaces and the cylindrical body is formed with side surfaces extending from said end surfaces and directed spirally along the cylindrical body in circumferentially spaced relation to form chip clearance flutes; each of said end surfaces having margins adjacent said apex forming oppositely facing cutting edges starting at said axis of rotation to form a split drill-point, second cutting edges on said end surfaces forming continuations of said split point cutting edges and directed toward the sides of said cylindrical body and third cutting edges continuing from said second cutting edges and curving into said cylindrical body side surfaces; and said side surfaces having side cutting edges which are continuations of said third cutting edges and follow said spiral flutes, said third cutting edges having a radius of curvature of about 12 percent of the diameter of the cylindrical body and blending into said second cutting edges and said side cutting edges, whereby said drill in forming a hole cuts from said axis of rotation at said apex to and including the cylindrical sides of said body.

4,116,581

SEVERE CLIMATE WINDMILL

Victor W. Bolie, 7504 American Heritage NE., Albuquerque, N. Mex. 87109

Filed Jan. 21, 1977, Ser. No. 761,398
Int. Cl.[2] F03D *7/00*
U.S. Cl. 415—2 **13 Claims**



1. A windmill adapted for use in severe climates, comprising:
a central structure supported by a plurality of legs;
a lower hemispheric enclosure supported about its vertical axis by, and encompassing, said central structure, the lower hemisphere being truncated by a horizontal cut exposing a concentric circular exit opening;
an upper hemispheric enclosure rotatably supported about its vertical axis by said central structure and coaxially with and above said lower hemispheric enclosure, the enclosures forming substantially a sphere, the upper enclosure being cut away at one side to expose an entry opening forming an air scoop, air entering the opening flowing downwardly across the equatorial plane and into said lower hemispheric enclosure and out of said exit opening;
a generator supported by said central structure, the generator having a shaft extending coaxially of said enclosure aixs;
and a fan affixed to said shaft at said exit opening.

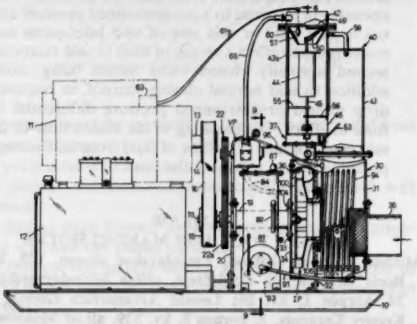
4,116,582

IMPELLER TYPE FLUID PUMP

Albert H. Sloan, 4201 Kean Rd., Fort Lauderdale, Fla. 33314

Division of Ser. No. 623,655, Oct. 20, 1975, Pat. No. 4,029,438.
This application Jan. 19, 1977, Ser. No. 760,535
Int. Cl.[2] F01D *25/12;* F04D *29/58;* F03B *11/00*
U.S. Cl. 415—175 **8 Claims**

1. An integral pump and drive shaft assembly comprising: a pump having a pump housing including a generally cylindrical side wall, a generally vertical back wall, and a front wall having an inlet opening, a tubular coil heat exchanger located in a forward portion of said pump housing whereby water entering said inlet opening passes over said heat exchanger, an impeller rotatably mounted in said pump housing, said impeller including a generally vertical, rear wall and a front wall, an inlet eye centrally located in said impeller front wall and a series of circumferentially spaced curved vanes located between and fixed to said front and rear walls of said impeller and for receiving water from the eye of said impeller, a diffuser mounted in said housing and on said rear wall of said pump



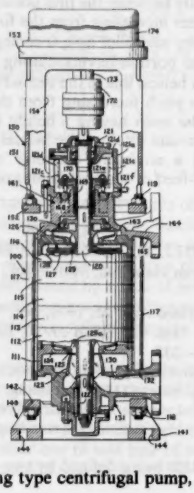
housing and concentric with said impeller and having a series of circumferentially spaced curved vanes for receiving water discharged from said impeller, said vanes of said diffuser being curved in a direction opposite to the curve of said impeller vanes; a drive shaft housing rigidly secured at one end to said rear wall of said pump housing, a drive shaft extending through and rotatably mounted in said shaft housing and connected in driving relationship with said impeller, a bearing means in said shaft housing and rotatably supporting said shaft in said shaft housing, and a fluid seal between said shaft and shaft housing.

4,116,583

MULTI-PURPOSE END CASINGS FOR RING TYPE MULTI-STAGE CENTRIFUGAL PUMPS

Allan R. Budris, Nutley, N.J., assignor to Worthington Pump, Inc., Mountainside, N.J.

Filed Mar. 2, 1977, Ser. No. 773,709
Int. Cl.[2] F01D *25/24;* F03B *11/02*
U.S. Cl. 415—199.1 **9 Claims**



1. In a multi-stage ring type centrifugal pump,

a. multi-purpose suction end casing means forming, a suction inlet for the fluid to be pumped by the centrifugal pump,
b. a plurality of intermediate pump stage casings having a corresponding plurality of pumping stages formed therein to form a fluid pumping flow path, at least the inlet one of said pumping stages defining an inlet for said fluid pumping flow path in communication with the suction inlet formed by the multi-purpose suction end casing means,
c. the last of said plurality of pumping stages defining an outlet for said fluid pumping flow path,
d. multi-purpose discharge end casing means forming a discharge outlet for the centrifugal pump and disposed to communicate with the outlet for said fluid pumping flow path formed by the last of said plurality of pumping stages,
e. said suction end casing having a first plurality of angularly spaced tie-rod lugs,
f. said discharge end casing having a second plurality of angularly spaced tie-rod lugs,
g. said first plurality of angularly spaced tie-rod lugs and said second plurality of angularly spaced tie-rod lugs each having a tie-rod bore forming a connecting means extending therethrough and respectively alignable with each other to permit the suction end casing and discharge end casing to be oriented so as to position the suction inlet and discharge outlet in the desired angular position relative to each other,
h. tie-rod means extending into the connecting means of said first plurality of tie-rod lugs and said second plurality of tie-rod lugs for holding said suction end casing, said plurality of intermediate pump stage casings, and said discharge end casing of said centrifugal pump in assembled position, and
i. means on the respective suction end casing and discharge end casing to aid and facilitate horizontal and vertical orientation of said multi-stage ring type centrifugal pump as desired, wherein said last mentioned means includes,
1. enlarged machined bearing surfaces about said connecting means on the respective plurality of tie-rod lugs and said second plurality of tie-rod lugs,
2. rabbet means formed by and disposed adjacent to each of said enlarged machined bearing surfaces operative with said machined bearing surfaces to provide spaced points of attachment on the respective suction end casing and discharge end casing for vertical orientation of said centrifugal pump,
3. said suction end casing having a first plurality of angularly spaced foot mounting means,
4. said discharge end casing having a second plurality of angularly spaced foot mounting means, and
5. said plurality of angularly spaced foot mounting means and second plurality of angularly spaced foot mounting means alignable in assembled position for horizontal disposition of said centrifugal pump.

4,116,584

DEVICE FOR EXTENDING THE WORKING RANGE OF AXIAL FLOW COMPRESSORS

Karl Bammert, Hanover, and Rudolf Staude, Bottrop, both of Germany, assignors to Gutehoffnungshütte Sterkrade AG, Oberhausen, Germany

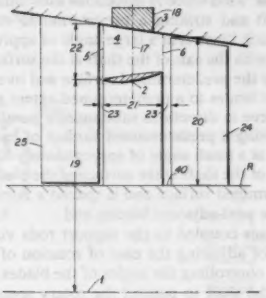
Continuation-in-part of Ser. No. 668,834, Mar. 22, 1976, abandoned, which is a continuation of Ser. No. 513,406, Oct. 9, 1974, abandoned. This application Feb. 4, 1977, Ser. No. 765,758

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1975, 2351308

Int. Cl.[2] **F01D** *1/02, 9/04;* **F04D** *29/54*

U.S. Cl. 415—199.5 **6 Claims**

1. An axial flow compressor comprising a rotor having a plurality of rotating blades mounted thereon, a central compressor axis about which said rotor rotates, a casing including an inner casing wall within which said rotor is located, said casing wall defining together with said rotor an annular compressor flow conduit converging in the direction of axial flow through said compressor, a plurality of stationary blades located in said compressor flow conduit upstream of said rotating blades, and a ring of airfoil cross section arranged concentrically to said compressor axis and located in said compressor flow conduit upstream of said rotating blades between said



rotating blades and said stationary blades, said airfoil ring being configured and arranged to define together with said casing wall an annular flow channel therebetween converging in the direction of flow through said compressor flow conduit.

4,116,585

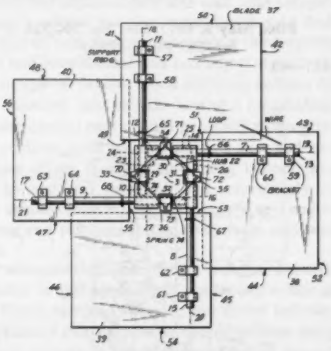
SELF-ADJUSTING WIND MACHINE

Mirko Maracic, 25-75 45th St., Astoria, N.Y. 11103

Filed Nov. 3, 1976, Ser. No. 738,618

Int. Cl.[2] **F03D** *7/04*

U.S. Cl. 416—41 **7 Claims**



1. A self-adjusting wind machine for harnessing the power of the wind, said wind machine comprising
a rotatably mounted shaft having output means coupled thereto and rotatable therewith for transferring rotary motion of the shaft, the shaft having an axis;
a plurality of support rods each having spaced opposite first and second ends and an axis;
a hub affixed to the shaft and rotatable therewith, said hub having mounting means for mounting the plurality of support rods in equidistantly spaced relation from the axis of the shaft in a plane perpendicular to said axis for free rotation about the axis of each of said rods, each of said rods extending in the same direction of rotation of the shaft, tangential to a coaxial circle of the shaft, and said rods being equiangularly spaced from each other, said hub further having securing means for permitting a predetermined axial movement of each of the support rods and preventing each of said rods from leaving the hub;
a plurality of substantially rectangular blades, each having a

side and being affixed to a corresponding one of the support rods in the area of said side and rotatable with the corresponding support rod, said blades converting a wind into rotation of said shaft, each of said blades rotating with the support rod to which it is affixed in accordance with the force and direction of the wind in a manner whereby at a weak wind force in directions substantially parallel to the shaft and striking a predetermined surface of each blade, each blade is at a large angle of approximately 130° to 140° with the axis of the shaft at the surface of the blade opposite the predetermined surface and overlaps the next-adjacent blades to a predetermined extent and at a strong wind force in directions substantially parallel to the shaft and striking a predetermined surface of each blade, each blade is at a small angle of approximately 95° to 100° with the axis of the shaft at the surface of the blade opposite the predetermined surface and is spaced a minimum distance from the next-adjacent blades; and

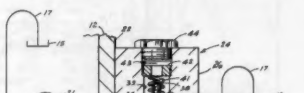
spring means coupled to the support rods via the securing means for adjusting the ease of rotation of said rods and thereby controlling the angles of the blades relative to the axis of the shaft to control the rotary speed of the shaft, said spring means comprising a plurality of pins each affixed to a corresponding one of the securing means and extending substantially radially therefrom substantially perpendicularly to the corresponding support rod, and a spring affixed to each of the pins and extending therebetween.

4,116,586

CONSTANT FLUID LEVEL CONTROL FOR MACHINE RESERVOIR

Richard Davidson Forney, Cincinnati; Richard Samuel Hernandez, Milford, and Richard Anderson Curless, Cincinnati, all of Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed May 9, 1977, Ser. No. 794,724
Int. Cl.[2] F04B *49/00*
U.S. Cl. 417—41 **1 Claim**



1. A constant fluid level control for machine reservoir, comprising in combination:

(a) a housing affixed to a machine carrier;

(b) a carrier reservoir maintaining a fluid level;

(c) a float in said reservoir movable in response to said fluid level;

(d) a bore in said housing;

(e) a spool slidably received in said bore;

(f) an orifice communicating with said bore on an upstream side and with said reservoir on a downstream side;

(g) a first fluid inlet line in said housing connected through pressure-dropping means to said bore between said upstream side of said orifice and an end of said spool;

(h) a second fluid inlet line in said housing connected to said bore between a pair of spool lands;

(i) a fluid motor mounted to said machine carrier;

(j) a fluid outlet line in said housing connected at one end to said bore for communication with said second fluid inlet line as said spool is shifted and connected at the other end to said fluid motor to influence speed control of said motor; and

(k) a fluid pump drivingly connected to said fluid motor and having the pump inlet in fluid communication with the fluid of said reservoir;

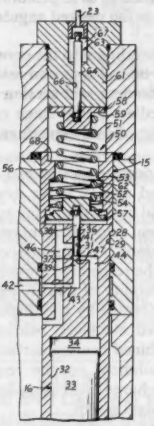
whereby said float is operable in response to said fluid level to directly restrict flow from said orifice, changing upstream pressure to shift said spool, thus varying said outlet line flow and motor speed in accordance with said fluid level, tending to match fluid level rise with reservoir pump down rate.

4,116,587

LOAD PLUS DIFFERENTIAL PRESSURE COMPENSATOR PUMP CONTROL ASSEMBLY

Kenneth P. Liesener, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 12, 1977, Ser. No. 841,426
Int. Cl.[2] F04D *25/00*; F16H *39/46*
U.S. Cl. 417—212 **4 Claims**



1. In a pump control assembly for moving a displacement control member of a variable displacement pump between maximum and minimum discharge displacement positions, said assembly having first means for controlling the position of the control member, said first means having an actuating means connected to the control member and a valve member positioned within a housing and having first and second end portions, said valve member being movable between a first position at which a pump discharge pressure signal is in communication with the actuating means and a second position at which said pump discharge pressure signal is blocked from communication with the actuating means and the actuating means is in communication with a drain, said first end portion of the valve member having an end substantially continuously exposed to said pump discharge pressure signal and being responsive thereto for biasing the valve member toward one of the first and second positions, the improvement comprising:

spring means for biasing the valve member toward the other of said positions in opposition to the biasing force exerted on the valve member by said pump discharge pressure signal for establishing a preselected minimum discharge pressure;

second means for increasing the biasing force of the spring means on the valve member for increasing the pump discharge pressure in response to a load pressure signal exceeding a preselected pressure level; and

said spring means having a first spring positioned between the second means and the valve member, and a second

spring positioned between the housing and the valve member, said second spring being of a construction and position sufficient for biasing the valve member toward said other position independently of the first spring and maintaining said pump discharge pressure at a preselected value above the load pressure signal only in response to the pump discharge pressure exceeding the preselected minimum discharge pressure level.

4,116,588

FLUID PUMP

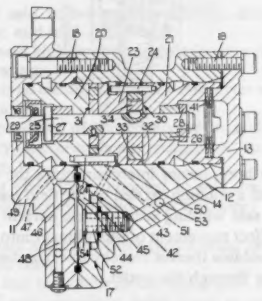
Ronald Phillips, Northolt, and James Campbell Melville, Acton, both of England, assignors to Lucas Industries Limited, Birmingham, England

Filed Aug. 12, 1976, Ser. No. 713,909

Claims priority, application United Kingdom, Jun. 22, 1976, 25824/76

Int. Cl.² F04C *11/00*

U.S. Cl. 417—252 **11 Claims**



2. A fluid pump comprising a housing defining a bore, an end wall forming part of the housing and closing one end of said bore, a detachable end closure forming an end wall closing the other end of the bore, a pump assembly located in said bore and including a drive shaft, an aperture in one end wall through which the drive shaft extends, the pump assembly further comprising three stator portions disposed in end to end relationship within said bore, resilient means acting between one end wall and the adjacent stator portion and acting to bias the stator portions axially into engagement with the other end wall, bearings carried by the end stator portions respectively and acting to support said shaft for rotation, said pump assembly also including a pair of pump units each comprising a fixed outer annular member, an inner annular member and a gear wheel, the outer annular member of each pump unit being located between and held in engagement with the central stator portion and the respective end stator portion, teeth found on the inner periphery of said inner annular member for engagement with the teeth of said gear wheel whereby as the gear wheel rotates in use the inner annular member will partake of gyratory movement within the outer annular member, means coupling said gear wheel to the shaft so that the gear wheel will be rotated thereby, a fluid inlet to the pump and a fluid inlet and fluid outlet for each pump unit, passage means connecting the pump fluid inlet to the inlet of one of the pump units, further passage means connecting the outlet of said one pump unit to the inlet of the other pump unit, a fluid outlet from the pump and still further passage means connecting the outlet of said other pump unit with said pump fluid outlet, and valve means responsive to the inlet and outlet pressures of said other pump unit and operable to maintain the pressure drop between the inlet and outlet of said other pump unit substantially zero whereby the rate of fluid flow through the pump fluid outlet will be proportional to the speed or rotation of the shaft.

4,116,589

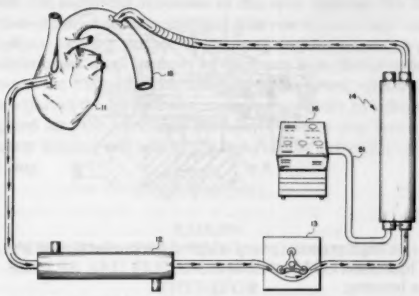
EXTRACORPOREAL PULSATILE BLOOD PUMP COMPRISED OF SIDE BY SIDE BLADDERS

Michael L. Rishton, Reading, Mass., assignor to Avco Corporation, Everett, Mass.

Filed Apr. 15, 1977, Ser. No. 787,787

Int. Cl.² F04B *9/12, 43/08*

U.S. Cl. 417—384 **8 Claims**



1. A blood pump comprising:

(a) an elongated rigid housing having a longitudinal axis, an annular side wall and oppositely disposed first and second end walls defining a closed chamber, said first end wall having a first opening off-set from said housing longitudinal axis and adjacent said side wall, said second end wall having a second opening coaxial with said first opening and one of said end walls having a third opening off-set from said longitudinal axis and adjacent said side wall;

(b) an elongated flexible blood pumping balloon disposed in said chamber, said balloon having a longitudinal axis, an annular central portion and generally sloping transitional end portions each terminating in a first and second port portion off-set from said pumping balloon longitudinal axis toward said side wall and respectively registering with said first and second openings in said end walls, said sloping end portions facing away from said housing side wall;

(c) an elongated flexible driver balloon disposed in said chamber in side-by-side and contacting relationship with said blood pumping balloon, said driver balloon having a longitudinal axis, an annular central portion and generally sloping transitional end portions facing inwardly away from said housing side wall and toward said blood pumping balloon sloping end portions, one of said end portions terminating in a third port portion off-set from said driver balloon longitudinal axis toward said side wall and registering with said third opening in said one of said end walls, the transitional end portions of said blood pumping and driver balloons each having a sloping configuration that results in substantially only rolling contact between the said balloons at these end portions;

(d) first and second connector means sealably carried by respectively said first and second end walls at said first and second openings for coupling said pumping balloon first and second port portions to blood carrying lines;

(e) third connector means carried by said one of said end walls at said third opening for coupling said driver balloon third port portion to a pressure line; and

(f) venting means including at least one air passage in said housing for providing communication between the interior of said housing and atmosphere.

4,116,590

DIAPHRAGM PUMP WITH PULSE PISTON POSITION RESPONSIVE WORK FLUID REPLENISHMENT

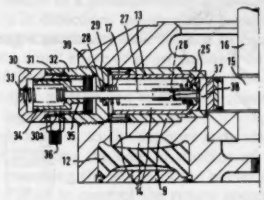
John Richard Prestwich, Reading, England, assignor to Warwick Pump and Engineering Company Limited, Berinsfield, England

Filed Jan. 19, 1977, Ser. No. 760,665

Claims priority, application United Kingdom, Jan. 20, 1976, 2126/76; Oct. 1, 1976, 40782/76

Int. Cl.[2] F04B *9/10, 35/02, 43/06;* **F01B** *19/02*

U.S. Cl. 417—387 **10 Claims**



1. A high pressure pump adapted for connection to a source of hydraulic fluid comprising:

a housing;

at least one diaphragm contained in said housing;

at least one reciprocating piston in said housing, spaced from said diaphragm for actuating said diaphragm, said reciprocating piston having pumping and return strokes;

means for supplying hydraulic fluid to the space between the diaphragm and the reciprocating piston, said means for supplying being adapted for connection to a source of hydraulic fluid and including a replenishment valve for replenishing the space with hydraulic fluid during the return stroke of the reciprocating piston to replace any hydraulic fluid lost during the pumping stroke of the reciprocating piston, the hydraulic fluid substantially filling the space between the diaphragm and the reciprocating piston, said diaphragm having one side directly acted upon by the reciprocating pump through the hydraulic fluid; and

a chamber having an inlet valve and an outlet valve, said diaphragm having a second side in communication with said chamber, said inlet and outlet valves being adapted to respectively connect said chamber to a supply passage and a discharge passage for fluid to be pumped, the resilience of the diaphragm acting against the reciprocating piston on the pumping stroke and with the reciprocating piston on the return stroke, said diaphragm being made of elastomeric material and having a thickness to diameter ratio of at least 1:5, the resilience of said diaphragm being sufficient for said diaphragm to be substantially self-restoring on the return stroke of the reciprocating piston against normal atmospheric pressure in the event of total blockage of the inlet valve or of the supply passage.

4,116,591

FUEL INJECTION PUMPS

John Edward Mardell, Uxbridge, England, assignor to Lucas Industries Limited, Birmingham, England

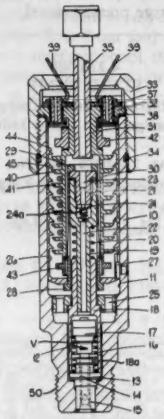
Filed Mar. 14, 1977, Ser. No. 776,827

Claims priority, application United Kingdom, Mar. 20, 1976, 11319/76

Int. Cl.[2] F04B *17/04*

U.S. Cl. 417—417 **10 Claims**

1. A fuel injection pump for supplying fuel to an internal combustion engine comprising a housing defining a stepped cylindrical bore, comprising a cylindrical member defining a pumping chamber and having a discharge outlet, said cylindrical member being secured within the narrower portion of said bore, a pumping plunger slidable into and out of said cylindrical member and extending into the wider portion of said bore, a fuel inlet to said chamber from the bore, and resilient means normally biasing the plunger outwardly of said cylindrical member to maintain said chamber at a maximum volume, an annular armature guided for movement by the wall of the wider portion of the bore, an annular field assembly disposed in a space defined between the armature and the plunger, said field assembly being supported by an end closure of the wider



portion of the bore, means interconnecting the armature and the plunger and a winding carried by the field assembly, means for supplying said winding with electric current actuating the armature to effect movement of said plunger into said chamber reducing the volume thereof thereby to cause discharge of fuel under pressure through the outlet.

4,116,592

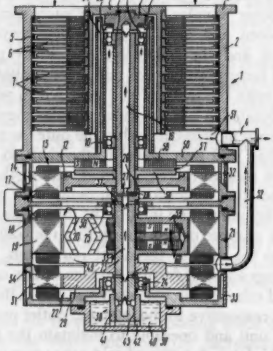
TURBOMOLECULAR HIGH-VACUUM PULP

Viktor Yakovlevich Cherny, ulitsa Zoi Kosmodemyanskoi 3, kv. 45; Boris Grigorievich Galperin, ulitsa Rozenshteina 36, kv. 22; Mikhail Mikhailovich Mikhailov, ulitsa Marshala Govorova 16, kv. 165; Vladimir Petrovich Meljukhov, ulitsa III Internatsionala 74, kv. 39, and Leonid Vasilievich Dobrokhotov, ulitsa Partizana Germana 33, kv. 155, all of Leningrad, U.S.S.R.

Filed Aug. 20, 1976, Ser. No. 716,258

Int. Cl.[2] F04B *17/00*

U.S. Cl. 417—424 **16 Claims**



1. A turbomolecular high-vacuum pump comprising:

a substantially vertically extending cylindrical casing;

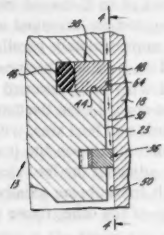
an inlet pipe for gas being evacuated provided on said casing;
an outlet pipe for gas being evacuated provided on said casing;
a pump stator having vanes accommodated in said casing, in the top part thereof;
a pump rotor having vanes accommodated in said casing, said vanes being disposed between said stator vanes to define passage for gas being evacuated;
bearings arranged within said casing;
a substantially vertically arranged high-speed hollow shaft extending within said casing, in the top part thereof, said shaft extending coaxially with said casing, being journalled in said bearings and connected to said rotor;
other bearings arranged within said casing;
a hollow low-speed shaft extending in the bottom part of said casing coaxially with said high-speed shaft, said low-speed shaft being journalled in said other bearings;
said shafts embracing each other at the ends facing each other for a part of their length;
a high-frequency electric drive motor arranged within said casing;
a rotor of said high-frequency electric drive motor connected to said high-speed shaft;
a stator of said high-frequency electric drive motor mounted in said casing;
a machine-type electric frequency converter accommodated in said casing;
an induction drive motor connected to said machine-type frequency converter being energizable through a source of power;
a generator electrically coupled to said machine-type frequency converter of said high frequency electric drive motor;
a rotor of said induction drive motor being mounted on said low-speed shaft;
a stator of said induction motor being fixed to said casing;
a stator of said generator being fixed to said casing and electrically coupled to said stator of said high-frequency electric drive motor;
means for lubricating the bearings, said means being arranged within said casing and mounted at the lower end of said low-speed shaft.

4,116,593

LUBRICANT METERING SYSTEM FOR ROTARY PISTON MECHANISM

Charles Jones, 208 Forest Dr., Hillsdale, N.J. 07642

Division of Ser. No. 739,521, Nov. 8, 1976, abandoned. This application Jul. 25, 1977, Ser. No. 818,412
Int. Cl.[2] F01C *19/08, 21/04*
U.S. Cl. 418—94 **3 Claims**



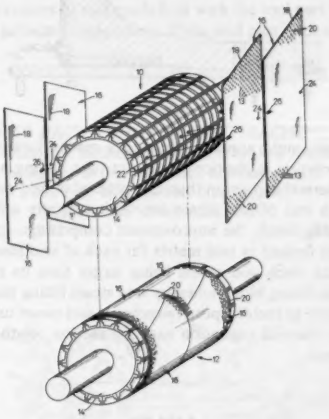
1. In a rotary mechanism having a housing comprising two end walls spaced apart by an intermediate wall having an inner peripheral surface of trochoidal shape and defining therebetween a multi-lobe cavity and having a rotor consisting of opposite side faces, a plurality of flank portions intersecting each other to form apex portions, and a hub portion, supported in the housing cavity at its hub portion on an eccentric portion of a mainshaft for planetary rotation and defining with the housing a plurality of working chambers which successively expand and contract in volumetric size as the rotor rotates in said cavity, the rotor carrying a seal grid, including seal strips and a lubricant seal ring located radially inwardly of the seal strips in at least one of the rotor side faces and surrounding the rotor hub portion, the seal ring having an outer peripheral contact surface engaging the adjacent housing end wall to seal the interstices between the rotor side face and the adjacent housing end wall, a lubrication metering system, including means for supplying lubricant to the area adjacent the hub portion of the rotor, comprising at least one recess in said outer peripheral contact surface of the seal ring for conducting a predetermined small quantity of lubricant from the interstices between the rotor side face and said adjacent end wall, in the area adjacent the hub portion, radially outwardly past the seal ring and into the interstices between the rotor side face said adjacent housing end wall in the area radially outwardly of the seal ring.

4,116,594

EMBOSSING APPARATUS HAVING MAGNETIC ROLLER AND FLEXIBLE EMBOSSING PLATES THEREFOR

Dale D. Leanna, Oconto Falls; Allen R. Jorgensen, Townsend; Thomas R. Curro, Green Bay, and Andrew M. Bray, Suamico, all of Wis., assignors to Magna-Graphics Corporation, Oconto Falls, Wis.

Continuation-in-part of Ser. No. 640,049, Dec. 12, 1975, abandoned. This application Feb. 9, 1977, Ser. No. 766,977
Int. Cl.[2] B29D *7/14*
U.S. Cl. 425—3 **6 Claims**



1. An embossing roller for use in embossing apparatus employing a pair of embossing rollers to apply an embossed pattern on a web of material passing between said rollers comprising:
a magnetic roller having a cylindrical surface;
a plurality of flexible embossing plates, each plate comprising magnetically attractable material and releasably secured to said cylindrical surface by magnetic attraction, adjacent ones of said embossing plates being disposed in contiguous relationship on said cylindrical surface to provide an uninterrupted continuous embossing pattern around said magnetic roller, each embossing plate including a backing portion and a web engaging portion having an embossing pattern thereon, said embossing pattern including projections which are extendable between other projections on the other embossing roller of such a pair of

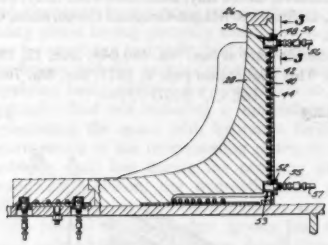
embossing rollers to physically deform said web and thereby provide said embossed pattern on said web; and interengagable means on said cylindrical surface of said magnetic roller and on each of said embossing plates associated therewith to align and to prevent shifting of said plates with respect to said cylindrical surface, said interengagable means comprising a first groove in said cylindrical surface around the circumference of said magnetic roller and a first projecting rib on each of said embossing plates and receivable in said first groove, said interengagable means further comprising a second groove in said cylindrical surface and extending axially of said magnetic roller, and a second projecting rib on each of said embossing plates and receivable in said second groove.

4,116,595

TIRE MOLD APPARATUS

Louis T. Fike, Hacienda Heights, and Kenneth A. Green, Ontario, both of Calif., assignors to Ohio Machine Company, Inc., Los Angeles, Calif.

Filed Sep. 23, 1977, Ser. No. 836,044
Int. Cl.[2] B29H *5/04*
U.S. Cl. 425—17 **3 Claims**



1. In tire mold apparatus having a matrix formed with a groove wherein is positioned a steam tube having a different rate of thermal expansion than the material of said matrix, and with each end of said steam tube being rigidly affixed to a steam-fitting block, the improvement comprising:

a recess formed in said matrix for each of said steam-fitting blocks, each said recess being larger than its respective steam-fitting block whereby said steam fitting blocks float relative to their respective recess as said steam tube undergoes thermal expansion and contraction relative to said groove.

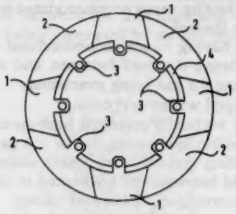
4,116,596

CONTRACTIBLE SEGMENTED RIGID CORE FOR A TIRE-CURING MOLD

Augusto Pizzorno, Milan, Italy, assignor to Industrie Pirelli S.p.A., Milan, Italy

Filed Sep. 6, 1977, Ser. No. 830,826
Claims priority, application Italy, Sep. 22, 1976, 27471 A/76
Int. Cl.[2] B29H *5/18*
U.S. Cl. 425—55 **2 Claims**

1. A contractible segmented rigid core of a tire-curing mold, comprising a plurality of sectors, and means which permit a reduction of the transversal dimensions of the sectors to facilitate removal thereof from the cured tire, said means which permit the reduction of the transversal dimensions of the sectors comprise forming each of the sectors in three parts transversely of the mold, one a central part provided with means for producing a movement under the action of resistant elastic or resilient biasing means along the symmetrical plane of the sector, and two lateral parts being adapted to oscillate, in contrast with the elastic or resilient biasing means, with respect



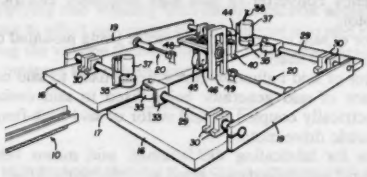
to an axis in the symmetrical plane of the sector and thereby having reduced transversal dimensions.

4,116,597

APPARATUS FOR FEEDING ELONGATFD EXTRUSIONS

James M. Dunstan, Kalamazoo, Mich., assignor to Acorn Building Components, Inc., Detroit, Mich.

Filed Jul. 29, 1976, Ser. No. 709,630
Int. Cl.[2] B23P *17/00, 19/00*
U.S. Cl. 425—110 **11 Claims**



1. Apparatus for longitudinally feeding substantially uniform cross-section elongated members, such as extrusions and the like, comprising:

a horizontal table-like support surface having opposite sides and an elongated longitudinal feed area extending from a forward end to a rear end of the support surface between the sides thereof;

a pair of opposed adjustable feed means located at opposite sides of the feed area for cooperatively feeding such member longitudinally along said feed area, with each said feed means being formed of an E-shaped frame whose back is formed of an elongated bar arranged at its adjacent support surface side, approximately parallel to the feed area and whose central leg is secured at one end to the bar, and at its opposite end is pivotally fastened to the surface and whose end legs are spaced from the center leg and extend transversely towards said feed area, with vertically axised rollers rotatably mounted upon the inner end of each of said end legs, i.e., adjacent the feet area;

and the legs of each frame being axially aligned with the corresponding legs of the other frame transversely of the support surface;

each of said central legs being selectively adjustable in length for thereby moving the respective rollers transversely towards and away from the feed area for thereby engaging an elongated member to be fed, between the opposing rollers of corresponding end legs;

and power means for rotating at least some of said rollers for thereby feeding elongated members longitudinally of the support surfaces along the feed area.

4,116,598

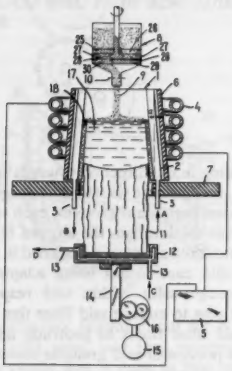
APPARATUS FOR PRODUCING HIGH-MELTING-METAL-OXIDE-BASED CRYSTALLINE MATERIALS

Vladimir Ilich Alexandrov; Vyacheslav Vasilievich Osiko; Vladimir Mikhailovich Tatarintsev, and Viktor Timofeevich Udovenchik, all of Moscow, U.S.S.R., assignors to Fizichesky Institut Imeni P.N. Lebedeva Akademii Nauk SSSR, U.S.S.R.

Continuation of Ser. No. 555,295, Mar. 4, 1975, abandoned. This application Mar. 3, 1977, Ser. No. 774,019

Int. Cl.[2] B29D *7/02*

U.S. Cl. 425—174.8 R 1 Claim



1. Apparatus for making a high-melting-metal-oxide based crystalline material by melting and crystallizing a part of the melt into the form of an ingot comprising, a continuous feed mechanism for feeding a powder-like crystallizable material, a water-cooled mold having an upper opening for continuously introducing therein a charge of said crystallizable material in a solid state and a bottom opening for removing from said mold a crystalline material subsequent to melting of the charge material and crystallizing thereof, said mold having an upper melting zone for containing molten material charged into the mold in a solid state and a crystallization zone within which the molten material is crystallized, a means defining a movable bottom on said mold closing the bottom of the mold and movable downwardly for withdrawing a solid crystalline ingot from said crystallization zone of said mold directly from below the melting zone, means operatively associated with said bottom to move said bottom downwardly at a rate for withdrawing said ingot downwardly while maintaining a steady state operation in which the volume of melt in said melting zone is maintained substantially constant in conjunction with the rate of feed of the charge by said feed mechanism, an inductive coil about said mold for applying energy of a high frequency electromagnetic field to define said melting zone of said mold, said melting zone constituting a major axial length of said mold, said mold having a body made as a truncated cone with the base of the cone being at the lower end of the mold and with an angle between its generatrix and cone height in a range of from 2° to 10°, a water jacket about said mold for cooling said mold along the axial length thereof to maintain an accretion of unmelted charge material circumferentially of said molten material in said melting zone and an interface of the charge material and the melt circumferentially of the melt, and said mold being divided circumferentially into a plurality of sections electrically insulated one from another.

4,116,599

DEVICE FOR ANCHORING AN INJECTION MOLDING MACHINE TOOL PART TO A TOOL CARRIER

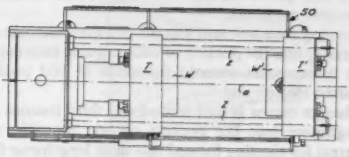
Edwin Rüegg, Netstal, Switzerland, assignor to Netstal-Maschinen AG, Switzerland

Filed Jun. 17, 1977, Ser. No. 807,668

Claims priority, application Switzerland, Jun. 29, 1976, 8287/76

Int. Cl.[2] B29F *1/00*

U.S. Cl. 425—192 R 4 Claims



1. A tool carrier mechanism for injection molding machines for securing a tool part to a tool carrier, comprising a guide bolt having means for connecting it to the tool part so that it projects outwardly from the rear of the tool part, a tool carrier having a bore there through for receiving said guide bolt and having a front face against which the rear of the tool part is engageable and having an opposite rear face beyond which said guide bolt projects, slide means mounted on said tool carrier adjacent said rear face of said tool carrier and being movable toward and away from said guide bolt for engagement and disengagement therefrom, and wedge surface means defined between said guide bolt and said slide effecting an inward movement of said guide bolt with the tool part to exert an inward pressure engagement of the tool part with said tool carrier.

4,116,600

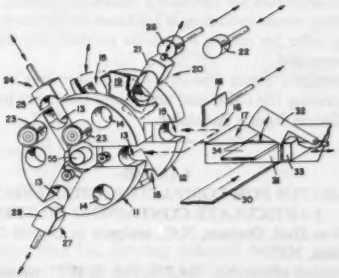
SOLID PACK TUNA CANNING MACHINE

Edward E. Dutton, Whittier, and Jack Gorby, Los Angeles, both of Calif., assignors to Sea-Pac, Inc., Gardena, Calif.

Filed Sep. 1, 1976, Ser. No. 719,415

Int. Cl.[2] A23P *1/00*; A22C *25/00*

U.S. Cl. 425—296 31 Claims



1. Fish-canning apparatus comprising:

(a) first and second movable members each having a fish-receiving and forming pocket formed into a surface thereof;

(b) first, second and third spaced-apart operational stations adjacent the path of movement of said movable members, said movable members being positionable adjacent each other at said first station with said pockets thereof in alignment with each other to form a single combined pocket;

(c) means at said first station for filling both of said pockets simultaneously with a single slug of fish;

(d) means operatively associated with said movable members for moving said movable members and for moving said members relative to each other to move the pocket of said first member from said first station to said second station and for moving said pocket of said second member from said first station to said third station;

(e) means operatively associated with said movable members for severing said slug of fish in said pockets crosswise thereto and between said pockets after said slug is filled into said pocket and before relative movement of said movable members;

(f) forming means at said second and third stations movable laterally into the pockets of said movable members thereat for forming the severed fish slugs in said pockets into desired shapes; and

(g) plunger means at said second and third stations movable lengthwise into the pockets of said movable members thereat for ejecting formed fish slugs lengthwise from said pockets.

4,116,601

APPARATUS FOR THE PRODUCTION OF FLAKES FROM GRANULAR PRODUCTS

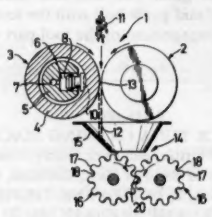
Rolf Lehmann, Mutschellen, and Alfred Christ, Zurich, both of Switzerland, assignors to Escher Wyss GmbH, Ravensburg, Wurtt, Germany

Filed Aug. 8, 1974, Ser. No. 495,826

Claims priority, application Switzerland, Aug. 16, 1973, 11794/73

Int. Cl.[2] B29C *15/00*

U.S. Cl. 425—324.1 **12 Claims**



1. An apparatus for producing flakes comprising

a rolling means including at least one deflection-compensating roller for rolling a granular product into flakes of flat shape; and

a texturizing means downstream of said rolling or means for receiving the flakes and deforming the flakes into a shape different from a flat shape.

4,116,602

APPARATUS FOR COMPACTING MULTI-SECTIONAL PARTICULATE CONTAINING FILTERS

Floyd Van Hall, Durham, N.C., assignor to Liggett Group Inc., Durham, N.C.

Continuation of Ser. No. 764,575, Feb. 1, 1977, abandoned. This application Mar. 16, 1978, Ser. No. 887,564

Int. Cl.[2] B30B *11/08*; A24C *5/48*

U.S. Cl. 425—354 **3 Claims**

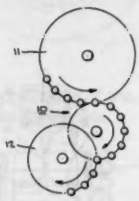
1. In combination with a multi-sectional particulate containing cigarette filter tips having spaced apart fibrous filter sections defining a cavity being partially filled with a granular material, an apparatus for moving a portion of the filter fibers of one filter section into the cavity whereby said cavity is filled with granular material and filter fibers protruding therein comprising

a rotatable shaft;

a transfer drum mounted on said shaft for rotation therewith, said drum having a plurality of circumferentially spaced peripheral grooves for receiving said filter tips;

a pair of punch wheels mounted on said shaft for rotation therewith, each said punch wheel having a generally cylindrical peripheral sleeve defining outwardly directed undulations and grooves on the opposite side of said undulations, each said groove being aligned with a respective groove of said transfer drum;

a plurality of punches, each said punch being slidably mounted in a respective groove of said punch wheel and each said punch having a pin mounted on the end thereof



and extending in the direction towards said transfer drum and being in alignment with said filter tips residing in said transfer drum peripheral grooves, each said pin being of a smaller cross-section than the aligned filter tip; and

cam means mounted about said shaft and in contact with said punches, said cam means being adapted to guide said punches reciprocally within said respective sleeve to cause said pins to engage said filter tips and move a portion of said filter fibers to protrude into said cavity to compact a portion of said granular material in said cavity and thereby forming a recess therein.

4,116,603

APPARATUS FOR CORRUGATING A WEB OF SHEET MATERIAL

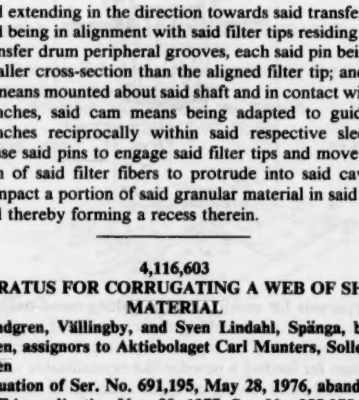
Ake Lindgren, Vällingby, and Sven Lindahl, Spånga, both of Sweden, assignors to Aktiebolaget Carl Munters, Sollentuna, Sweden

Continuation of Ser. No. 691,195, May 28, 1976, abandoned. This application Nov. 30, 1977, Ser. No. 855,975

Claims priority, application Sweden, Jul. 4, 1975, 7507719

Int. Cl.[2] B29C *15/00*

U.S. Cl. 425—370 **5 Claims**



1. In an apparatus for corrugating continuously a web of deformable material as it is advanced between a corrugating head and a longitudinally extending forming table comprising a row of abutting corrugating plates which are circulated in closed path by a pair of drive belts each engaging a pair of oppositely disposed pulleys and being spaced from one another for articulately supporting the corrugating plates therebetween, the improvement comprising:

(a) a journal shaft extending from each of the opposite sides of the corrugating plates transversely to their direction of travel and connecting each of said plates to the adjacent drive belt;

(b) said journal shafts being offset from one another in their

direction of travel to support the corrugating plates on the drive belts in a non-tiltable position; and

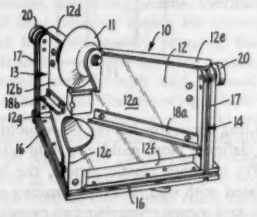
(c) said drive belts being correspondingly offset to provide separate individual movement of the corrugating plates tier-wise about the pulleys in a horizontal face-up position substantially parallel to the upper straight-away portions between the pulleys.

4,116,604

CORNER FINISHING TOOL

Eugene R. Johnson, Burlingame, and Morris F. Mower, Santa Clara, both of Calif., assignors to Bliss & Laughlin Industries, Inc., Oak Brook, Ill.

Filed Jun. 23, 1977, Ser. No. 809,279
Int. Cl.[2] B05C *17/10*; B29C *23/00*
U.S. Cl. 425—458 **6 Claims**



1. An improved corner finishing tool for applying mastic material along a wall joint, said tool comprising container means defining a cavity that is open in two convergent and substantially perpendicular planes and having surfaces in each of said planes that converge peripherally of said cavity; said container means comprising an angular retainer plate having a pair of integral sides resiliently joined at a corner, a pair of L-shaped frame members secured to said pair of integral sides, respectively, one side and frame member being resiliently movable relative to the other side and frame member; a pair of doctor blades mounted along intersecting edges of said frame members for doctoring mastic material that flows thereunder; and improved means for adjusting the resilient flex between said pair of integral sides comprising a pin and sleeve telescopically joined, one end of said pin and one end of said sleeve being pivotally secured to one of said integral sides, respectively; a second sleeve mounted on said first sleeve for axial and rotational movement thereon, said second sleeve having an irregular end surface engageable with a stop secured to said sleeve, and a helical spring disposed between said second sleeve and a contact with said pin, said spring applying a resilient force pressing the irregular end surface against said stop and urging said pin in an extended direction relative to said first sleeve.

4,116,605

APPARATUS FOR PRODUCING RETREADING ENVELOPES

John R. Burrell, 202 King Rd., Chalfont, Pa. 18914

Division of Ser. No. 680,273, Apr. 26, 1976, abandoned. This application Aug. 30, 1976, Ser. No. 718,792
Int. Cl.[2] B29D *23/04*
U.S. Cl. 425—466 **7 Claims**

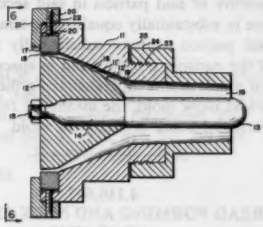
1. In an apparatus for producing an improved retreading envelope for tires,

an extrusion device having a die and a core positioned within said die and cooperating therewith to define an annular extrusion orifice which essentially determines the thickness of the extruded envelope,

a body portion of said die cooperating with said core to define a toroidal chamber adjacent to said orifice, said chamber being bounded by an internal surface of the body portion and by an exterior surface of the core,

and means defining an annular chamber adjacent to and communicating with said toroidal chamber through which natural or synthetic material fed to said extrusion device is passed as it flows to said toroidal chamber,

the improvement comprising the provision of said core having a shape which has a generally symmetrically tapered shape on one portion thereof and a cambered curvature throughout another portion thereof, said portions circumferentially forming said exterior surface of said core, said cambered curvature providing a partially deformed core configuration to result in an extruder envelope of high density characterized by a high concentration of material along its tread face and gradually diminishing sidewall thickness.

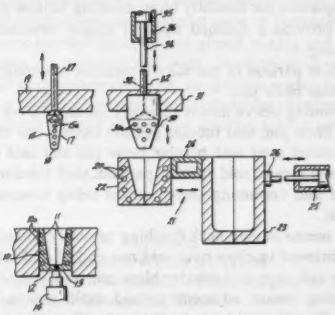


4,116,606

APPARATUS FOR THE PREPARATION OF HOLLOW PLASTIC ARTICLES

Emery I. Valyi, 5200 Sycamore Ave., Riverdale, N.Y. 10471

Division of Ser. No. 618,782, Oct. 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 473,580, May 24, 1974, Pat. No. 3,966,378. This application Jun. 27, 1977, Ser. No. 810,081
Int. Cl.[2] B29D *23/03*
U.S. Cl. 425—526 **19 Claims**



1. An apparatus for forming oriented hollow articles of moldable organic plastic material which comprises: a temperature controlled first core and a temperature controlled first mold; means for providing an organic plastic parison on said first core in said first mold in a formable condition at a temperature substantially above that required for orientation of said plastic; means for rapidly altering the heat content of said parison on said first core in said first mold with an unequal distribution of temperature across the walls of said parison resulting and to result substantially in the heat content of said parison corresponding to an average temperature suited for orientation; a temperature controlled second core and second mold in spaced relationship to said first core and first mold; means to transfer said first core bearing said parison to said

second mold; means for partially forming said parison located on said first core in said second mold to separate said parison from said first core and conform said parison to the shape of said second mold and to have an inside configuration shaped to permit insertion of said second core therein in substantially full contact therewith; means for separating said first core and second mold and partially formed parison contained therein; means for inserting the second core into the partially formed parison contained in the second mold; means for controlling the temperature of said parison in said second mold on said second core to substantially equalize the temperature distribution of said parison without substantially altering the heat content of the parison; a blow mold in spaced relationship to said second mold; means for transferring the partially formed parison to said blow mold; the means for fully expanding the partially formed parison in said blow mold.

4,116,607

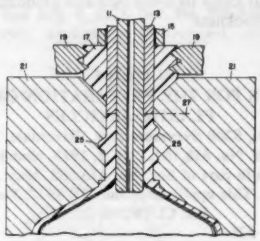
THREAD FORMING AND NECK FINISHING APPARATUS

Richard Webster LeGrand, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Division of Ser. No. 754,203, Dec. 26, 1976, Pat. No. 4,065,535. This application Jul. 7, 1977, Ser. No. 813,575

Int. Cl.² B29D *23/03*

U.S. Cl. 425—525 **1 Claim**



1. Apparatus for biaxially blow molding hollow plastic articles to provide a finished neck of axially oriented material comprising:

a tubular parison of partially crystalline material;

a tubular blow pin;

a cramming sleeve means slideably mounted over said tubular blow pin, said tubular parison having one end thereof mounted over said tubular blow pin and said cramming sleeve means, said tubular parison, said tubular blow pin and said cramming sleeve means being concentric of an axis;

mold means having neck finishing cavities contained therein positioned to close over said one end of said tubular parison and over said tubular blow pin; and,

clamping means adjacent to said mold means, means to axially orient said tubular parison with respect to said axis, means operable to move said clamping means toward said cramming sleeve means to grasp said one end of said tubular parison on said tubular blow pin and said cramming sleeve means before said tubular parison is axially oriented and necks down over said tubular blow pin, means to close said neck finishing cavities of said mold means about the portion of said tubular parison positioned over said tubular blow pin after said tubular parison has been axially oriented, and means to move said cramming sleeve means along said axis to force a portion of the axially oriented tubular parison into the neck finishing cavities, said tubular blow pin having means introducing blow air to radially expand the remainder of said tubular parison to form a finished container.

4,116,608

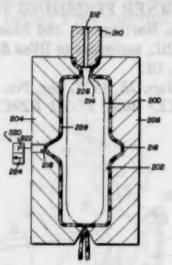
APPARATUS FOR FORMING A BLOWN PLASTIC CONTAINER

Albert R. Uhlig, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 735,554, Oct. 26, 1976, Pat. No. 4,070,429. This application Jul. 7, 1977, Ser. No. 813,642

Int. Cl.² B29D *23/03*

U.S. Cl. 425—525 **6 Claims**



1. In a molding apparatus having blow mold sections which cooperate to define a blow mold cavity in which a parison is blown to form a blown plastic article, the improvement of means associated with said mold for forming a opening in the blown article, said means comprising an opening in one of said mold sections connecting the mold cavity with the atmosphere, valve means for selectively opening and closing the opening, and means independent of said opening for introducing air into a parison confined in said cavity, said valve means (a) closing the port during the introduction of air under pressure during a blow molding operation to form the blow plastic article and (b) opening the port to atmosphere subsequent to the blow molding operation so that the air under pressure within the blown article ruptures that portion of the article overlying the port and vents through the port to atmosphere.

4,116,609

APPARATUS FOR THE CONTINUOUS PRODUCTION OF ORIENTED HOLLOW BODIES

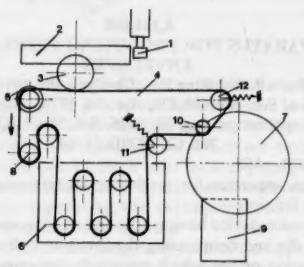
Marc Obsomer, Brussels; Luc Bodson, Grez-Doiceau, and Edmond Michel, Brussels, all of Belgium, assignors to SOLVAY, & Cie., Brussels, Belgium

Continuation of Ser. No. 647,072, Jan. 7, 1976, abandoned. This application Nov. 7, 1977, Ser. No. 849,446

Claims priority, application Luxembourg, Jan. 7, 1975, 71598; Jun. 27, 1975, 72853

Int. Cl.² B29D *23/03*

U.S. Cl. 425—526 **11 Claims**



1. Apparatus for the continuous production of oriented hollow bodies from a thermoplastic comprising:

parison producing means for producing a continuous tubular parison from a thermoplastic;

preform blowing means arranged to be fed with the continuous tubular parison for blowing the parison into preforms, said preform blowing means including molds aligned end to end contiguously on a first rotary carrier for each producing, by blowing, a separate preform having a true neck connected to one end of the body of the preform and possessing an annular bulge and a false neck connected to the end of the true neck which is remote from the body of the preform, the true neck corresponding to the neck of the finished oriented hollow body;

deflashing means for deflashing the necks of the preforms by removing the false necks thereof;

thermal conditioning means for bringing the preforms to their optimum orientation temperature;

final blowing means including a plurality of molds mounted on a second rotary carrier;

transfer means operatively associated with said preform blowing means, deflashing means, thermal conditioning means and final blowing means for conveying the preforms, and for continuously bringing the preforms in sequence from the preform blowing means, past said deflashing means and through said thermal conditioning means, and then to the final blowing means while moving them successively and continuously, said preform transfer means including carriers and a continuously moving endless chain on which said carriers are arranged to support the preforms in the region of their true necks which has already been molded, said endless chain undergoing a heat cycle along its path of travel and play existing between said endless chain and each of said blowing means, tending to produce slight fluctuations in the travel of said carriers in relation to both of said blowing means; a drive motor connected to drive said preform blowing means, said endless chain and said final blowing means for synchronizing the movement of said endless chain, in the region of said preform blowing means, with the discharge of preforms from said preform blowing means and, in the region of said final blowing means, with the introduction of preforms into said final blowing means; first drive coupling means connected to said motor for driving said first rotary carrier and said endless chain in the region of said preform blowing means; second drive coupling means connected to said motor for driving said second rotary carrier and said endless chain in the region of said final blowing means; and tensioning means for maintaining a selected tension in said chain over its path of travel from said preform blowing means to said final blowing means.

4,116,610

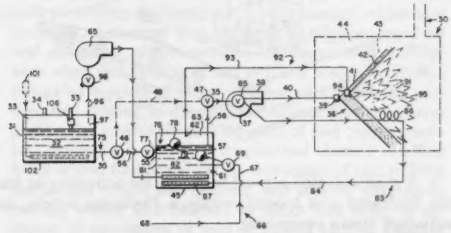
COMBUSTION PROCESS

Camille Berthiaume, Hampton, N.H., assignor to Columbia Chase Corporation, Braintree, Mass.

Continuation-in-part of Ser. No. 612,109, Sep. 10, 1975, Pat. No. 4,008,038. This application Oct. 26, 1976, Ser. No. 735,635

Int. Cl.[2] F23J *7/00*

U.S. Cl. 431—4 **10 Claims**



1. A process for burning liquid hydrocarbons at high temperatures within the confines of a combustion chamber, said process comprising the steps of:

(i) emulsifying said hydrocarbon with a water and a gaseous dispersing fluid to form a fuel emulsion,

(ii) passing said emulsion under a higher pressure to a burner head and into a furnace at a lower pressure, causing said dispersing fluid to expand and dispense said fuel emulsion.

4,116,611

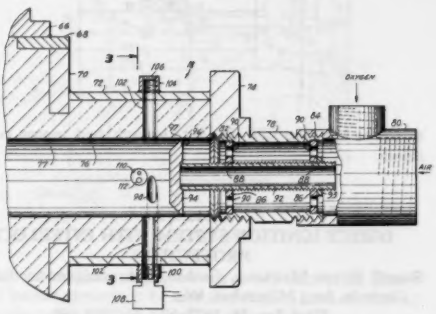
GASEOUS AND LIQUID FUEL BURNER

Andrew J. Syska, Marblehead, Mass., assignor to Consolidated Natural Gas Service Company, Pittsburgh, Pa.

Filed Sep. 1, 1976, Ser. No. 719,428

Int. Cl.[2] F23D *15/02*

U.S. Cl. 431—353 **7 Claims**



1. A burner comprising a substantially cylindrical refractory-lined mixing and combustion chamber having an open end, a burner disc positioned on the axis of said mixing and combustion chamber at the opposite end thereof and having a diameter smaller than the inside diameter of said mixing and combustion chamber and chamfered around the periphery thereof to define an annular oxidizer opening therebetween of increasing cross-sectional area toward the open end of said mixing and combustion chamber, at least one fuel port communicating with said mixing and combustion chamber, an ignition source port communicating with said mixing and combustion chamber and an ignition source located within said ignition source port.

4,116,612

GAS MONITOR SYSTEM

Hans L. Melgaard, Minneapolis, Minn., assignor to Despatch Industries, Inc., Minneapolis, Minn.

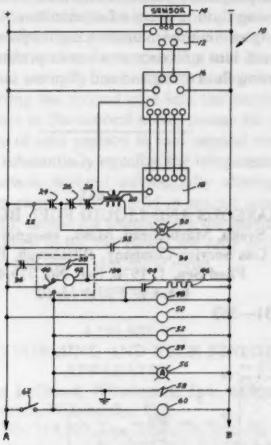
Filed Jan. 31, 1977, Ser. No. 764,212

Int. Cl.[2] F23H *5/02*

U.S. Cl. 431—76 **21 Claims**

1. Gas monitor system to monitor combustible or flammable gas concentration comprising equipment means containing generated combustible or flammable gases, an exhaust flue in connection with said equipment means, a damper rotatably mounted in said exhaust flue, a motor means connected to said damper, a motor control means connected to said motor, combustible or flammable gas monitor having upper and lower set points connected to said motor control means, a sensor connected to said combustible or flammable gas monitor and calibration means including means periodically locking the damper in an open position and means for contacting the sensor with a known calibration gas to check calibration of the gas

monitor system, whereby said combustible or flammable gas monitor senses the lower flammable limit in said equipment



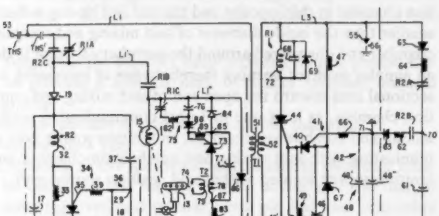
means to regulate said damper through said motor control means.

4,116,613

DIRECT IGNITION SYSTEM WITH INTERLOCK PROTECTION

Russell Byron Matthews, Goshen, Ind., assignor to Johnson Controls, Inc., Milwaukee, Wis.

Filed Jan. 24, 1977, Ser. No. 761,660
Int. Cl.[2] F23H *5/00*
U.S. Cl. 431—78 **23 Claims**



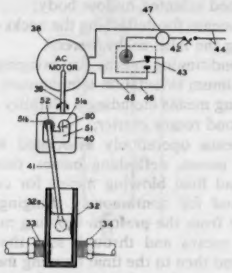
1. In a fuel ignition system including valve means operable when energized to supply fuel to a burner apparatus for ignition to establish a flame at said burner apparatus, a control circuit comprising control means including switching means, activate means responsive to a first condition to effect the energization of said control means over a first circuit path causing said switching means to operate and complete a portion of an energizing path for said valve means, flame sensing means operable when enabled to complete said energizing path thereby effecting the energization of said valve means to permit fuel to be supplied to said burner apparatus, and ignition timing means responsive to operation of said switching means to generate a timing signal defining a trial for ignition time interval, said timing signal below coupled to said flame sensing means by said switching means, to enable said flame sensing means for said trial-for-ignition time interval, said flame sensing means being operable to maintain said valve means energized when a flame is sensed at said burner apparatus during said time interval, and to cause the deenergization of said valve means when a flame fails to be sensed during said time interval.

4,116,614

OIL HEATER HAVING CONTROLLED OIL FLOW

Wolfgang A. Kutrieb, P.O. Box 1635, 1527 Beloit Ave., Janesville, Wis. 53545

Filed Feb. 2, 1977, Ser. No. 764,718
Int. Cl.[2] F23N *1/00*
U.S. Cl. 431—89 **9 Claims**



1. An improved oil burning heater of the type having a vaporizer pan for vaporizing by action of heat the oil that is supplied thereto, a feed tube for supplying oil to the vaporizer pan, and a fuel tank for holding oil, wherein the improvement comprises:

(a) a reciprocating piston pump having an inlet for receiving oil from the fuel tank on an intake stroke of the piston of said pump and an outlet for exhausting oil therefrom to the feed tube on an exhaust stroke of the piston;

(b) drive means for driving the piston of said pump at a constant reciprocation rate and at a selected one of a long reciprocating piston stroke and a shorter reciprocating piston stroke; and

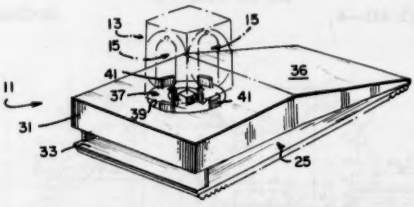
(c) means responsive to temperature for controlling said drive means to drive said pump at said long stroke below a selected temperature and at said short stroke above the selected temperature.

4,116,615

DOOR-ACTUATED ACTIVATION MEANS FOR FLASHLAMP ARTICLE

Harold H. Hall, Jr., Marblehead, and Andre C. Bouchard, Peabody, both of Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Oct. 5, 1977, Ser. No. 839,652
Int. Cl.[2] G08B *3/14, 7/08, 13/08*
U.S. Cl. 431—92 **12 Claims**



1. A door-actuated activation means for activating at least one flashlamp unit located within a flashlamp article, and activation means comprising:

a housing including a base portion and movable arm portion, said movable arm portion pivotally mounted on said base

portion for moving toward said base portion in response to external actuation of said housing by a door;

a casing secured to said arm portion of said housing and including a seating portion for having said flashlamp article positioned thereon;

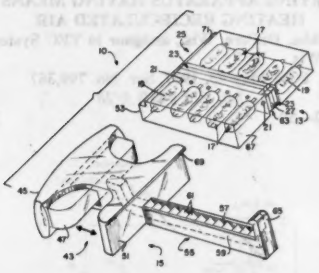
an activator located substantially within said casing in operative relationship to said base portion for effecting activation of said flashlamp unit within said flashlamp article when said article is positioned on said seating portion of said casing, said activator effecting said activation in response to movement of said arm portion of said housing toward said base portion; and

means located substantially within said housing in operative relationship to said arm and base portions of said housing for applying a force between said portions to effect separation thereof.

4,116,616
FLASHLAMP ASSEMBLY UTILIZING DISPOSABLE FLASHLAMP ARTICLE

Harold H. Hall, Jr., Marblehead, and Andre C. Bouchard, Peabody, both of Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Apr. 25, 1977, Ser. No. 790,217
Int. Cl.² F21K 5/02
U.S. Cl. 431—93 **21 Claims**



1. A disposable flashlamp article for being actuated by an actuating mechanism including a body member having a seating portion thereon, an elongated support member adjoining said seating portion and including a longitudinal slot therein, and an elongated ratchet member movably oriented within said longitudinal slot, said article comprising:

a housing defining at least one elongated chamber therein, said housing including a base portion adjacent said elongated chamber and defining a longitudinal channel therein substantially parallel to said elongated chamber;

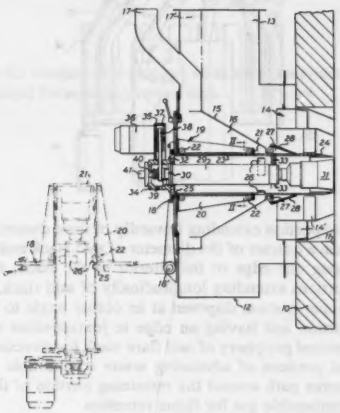
a plurality of percussively-ignitable flashlamps arranged in an array within said elongated chamber of said housing, each of said flashlamps including a light-transmitting envelope and a primer member projecting therefrom, each of said primer members mounted within said base portion of said housing and extending within said longitudinal channel; and

a resilient striking mechanism movably oriented within said longitudinal channel and adapted for being engaged by said elongated ratchet member of said actuating mechanism when said housing of said article is positioned on said elongated support member and against said seating portion, said striking mechanism including a protruding arm portion for selectively striking each of said primer members extending within said longitudinal channel to effect firing of said flashlamps during movement of said striking mechanism within said channel, said striking mechanism moving within said channel to effect said firing in response to movement of said elongated ratchet member within said longitudinal slot of said elongated support member of said actuating mechanism.

4,116,617
DEVICE IN BURNERS, IN PARTICULAR ROTARY BURNERS

Torsten Lorentz Backman, Mölndal, and Sten Yngve Olsson, V.Frölunda, both of Sweden, assignors to Ingenjorsfirman Petrokraft AB, Gothenburg, Sweden

Filed Mar. 8, 1977, Ser. No. 775,563
Claims priority, application Sweden, Mar. 12, 1976, 7603226
Int. Cl.² F23C 5/02
U.S. Cl. 431—186 **8 Claims**



1. A device in burners, particularly rotary burners for allowing the burner element to be removed from a furnace without necessarily turning off said furnace comprising:

a heater wall having an opening thereon,

means forming a wind chamber about said opening, a secondary air supply duct connected to said wind chamber,

a burner cup substantially centrally disposed in said opening,

a secondary air nozzle disposed between said opening and said burner cup which communicates with said wind chamber,

an elongate tube between said secondary air nozzle and said cup, said tube having a primary air supply nozzle at a terminal portion proximate to said burner cup and a primary air supply duct communicating with said primary air supply nozzle, an opening in said windbox,

a scuttle closing said opening and disposed about said elongate tube at a terminal portion remote from said burner cup, means pivotably mounting said scuttle on said windbox,

and guide means connected to said scuttle extending towards said burner cup and supporting said elongate tube whereby said elongate tube and burner cup are retractable from said heater wall opening and said scuttle is pivoted so that said burner tip and elongate tube may be removed for servicing by first retracting said tube and burner cup and then pivoting said scuttle.

4,116,618
FLAME RETENTION APPARATUS FOR FLARES

John F. Straitz, III, Meadowbrook, Pa., assignor to Combustion Unlimited Incorporated, Elkins Park, Pa.

Filed Jul. 13, 1977, Ser. No. 815,100
Int. Cl.² F23D 13/20
U.S. Cl. 431—202 **4 Claims**

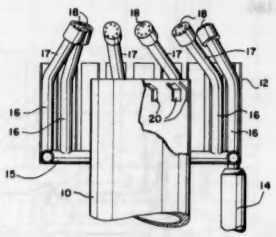
1. Flame retention apparatus for a flare stack which comprises

a cylindrical flare stack having a central opening at the discharge end of the stack for outward waste combustible gas delivery for combustion,

flame retention means at the discharge end of the stack

comprising a plurality of guide vanes spaced around the interior periphery of the stack and for changing the direction of the external portions of the stream of waste combustible gas with respect to the remaining portion of the stream of waste combustible gas, the interior of the discharge end of said flare stack being unobstructed except for said vanes,

each of said guide vanes having



a base portion extending inwardly of for a distance of less than a quarter of the diameter of said stack and secured along one edge to the interior of the stack, said base portions extending longitudinally of said stack, and

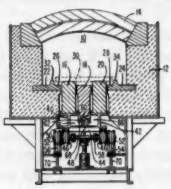
an upper portion disposed at an obtuse angle to the base portion and having an edge in juxtaposition with the internal periphery of said flare stack for directing external portions of advancing waste combustible gas in a vortex path around the remaining portion of the waste combustible gas for flame retention.

4,116,619

MULTIPLE BEAM FURNACE

Jacob Howard Beck, Waban, Mass., assignor to BTU Engineering Corporation, North Billerica, Mass.

Filed May 26, 1977, Ser. No. 800,871
Int. Cl.[2] F27D *1/16*; F27B *9/14*
U.S. Cl. 432—3 **9 Claims**



8. In a multiple beam furnace comprising:

an elongated furnace chamber formed of a high temperature material and having a hearth which includes shoulder portions disposed along the length thereof and adapted to support product carriers thereon;

first and second beams at least coextensive with the active length of said furnace chamber, each beam formed of a high temperature material and having an upper surface confronting said chamber and serving as part of the furnace hearth, and adapted for cyclic vertical and horizontal movement;

a third beam supported in a fixed position intermediate said first and second beams and formed of a high temperature material and having an upper surface confronting said chamber and serving as part of a furnace hearth, said third beam being in fixed position during cyclic movement of said first and second beams for the transport of product carriers through the furnace chamber;

first means coupled to said first and second beams and operative to elevate said first and second beams to a position above the plane of said shoulder portions to raise product carriers off of said shoulder portions and to lower said first and second beams to a position below the plane of said shoulder portions to replace product carriers onto said shoulder portions;

second means coupled to said first and second beams and to said first means and operative to provide lateral movement of said first and second beams along the axis of said furnace in a first direction when said first and second beams are in their upper position, and in an opposite direction when said first and second beams are in their lower position; and

means for providing cyclic operation of said first and second beams to transport product carriers in stepwise fashion through said furnace chamber;

the method comprising:

elevating said first and second beams to a position above said upper position to cause engagement and support of said third beam by said first and second beams;

removing the support for said third beam;

lowering the engaged first, second and third beams to a supporting surface below the furnace chamber; and

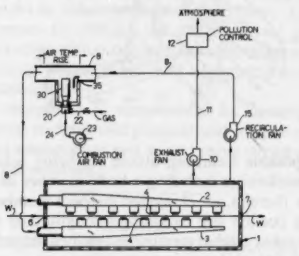
moving the engaged beams as a single unit from the furnace

4,116,620

WEB DRYING APPARATUS HAVING MEANS FOR HEATING RECIRCULATED AIR

Paul H. Stibbe, DePere, Wis., assignor to TEC Systems, Inc., DePere, Wis.

Filed May 23, 1977, Ser. No. 799,367
Int. Cl.[2] F27B *9/28*
U.S. Cl. 432—59 **2 Claims**



1. Web drying equipment including a dryer through which a web passes, web drying nozzles within the dryer for directing heated air against said web, a conduit for recirculating air from the interior of said dryer and to said nozzles, and apparatus for heating said recirculated air, said apparatus including a compartment secured to and extending from said conduit, a burner, means for supplying combustion air and fuel to said burner for mixing and burning thereof as the mixture is discharged from the burner, a containment tube located in said compartment and secured to the burner for receiving the discharged mixture therefrom and for shielding the resultant flame of the burning mixture, said containment tube having a discharge end for discharging heat and products of combustion therefrom, said end being located in communication with the interior of said recirculated air conduit whereby the discharge from said tube mixes directly with said recirculated air to heat the latter, said tube shielding the flame from said recirculated air, and a curved baffle means having one portion in said compartment and positioned parallel to and adjacent said tube, said baffle means also having a curved portion in said conduit for scooping and directing recirculated air from said conduit and directing it around the exterior of said tube to promote the heat transfer to said recirculated air.

4,116,621

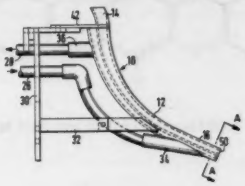
FEEDING CHUTE OR GATE

Leo Brassel, Kalenborn, Fed. Rep. of Germany, assignor to Schmelzbasaltwerk Kalenborn, Dr. Ing. Mauritz KG, Kalenborn, Fed. Rep. of Germany

Filed Mar. 9, 1977, Ser. No. 778,062
Int. Cl.[2] F27D *9/00, 9/12*
U.S. Cl. 432—233 **12 Claims**

1. A gate for casting molten material, including smelting basalt, which gate, particularly useful for spin-casting molds, comprises:

a channel having a main section, an end section, and a drawn-back inlet section, said main section having an impact region for the molten basalt stream located in the first third thereof, said inlet section being located above said impact region and provided with an arcuate wall defining the outer periphery thereof; and



means for cooling said channel so as to attain a temperature required for spinning operations.

4,116,622

DYEING PREPARATIONS AND PROCESS FOR DYEING POLYACRYLONITRILE MATERIAL IN STRONG, NEUTRAL, CLEAR BLUE SHADES

Josef Koller, Reinach, and Stefan Koller, Ramlinsburg, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

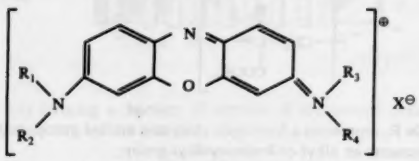
Filed Jul. 12, 1976, Ser. No. 704,271

Claims priority, application Switzerland, Jul. 17, 1975, 9356/75; Jun. 1, 1976, 6856/76

Int. Cl.[2] D06P *1/00, 3/70*

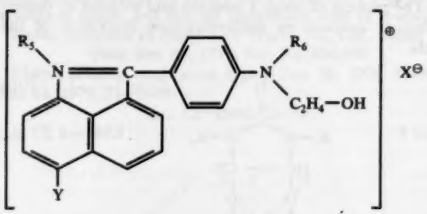
U.S. Cl. 8—25 7 Claims

1. A process for dyeing polyacrylonitrile in clear, neutral blue shades, which comprises the use of a mixture of an oxazine dye of the formula



(1)

and a naphtholactam dye of the formula



(2)

in the ratio of 1:3 to 3:1, in which R_1 and R_2 represent low molecular alkyl radicals, R_3 represents a low molecular alkyl radical or an aryl radical, R_4 represents hydrogen or a low molecular alkyl radical, each of R_5 and R_6 represents a low molecular alkyl radical, Y represents a halogen atom and $X\ominus$ represents an anion.

4,116,623

CYANOTRIPHENODIOXAZINE COMPOUND

Seiichi Imahori, Kawasaki; Yukichi Murata, and Sumio Suzuki, both of Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

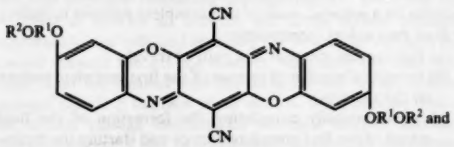
Filed Jul. 25, 1977, Ser. No. 818,841

Claims priority, application Japan, Jul. 27, 1976, 51-89576

Int. Cl.[2] C09B *19/00;* C07D *498/22*

U.S. Cl. 8—25 17 Claims

17. A dyestuff comprising a mixture of compounds, as coloring ingredients, of the following formulae



and

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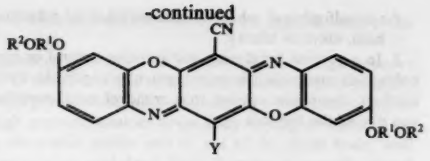
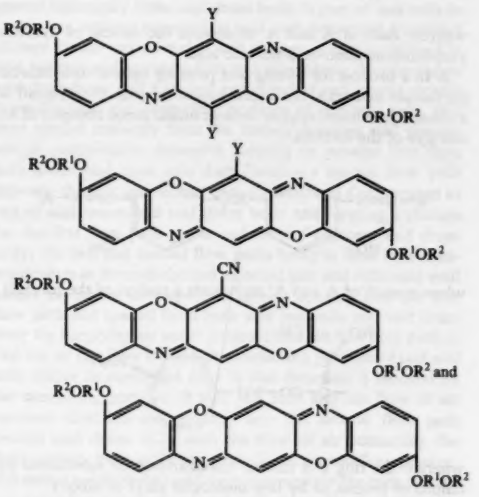


and, optionally, at least one of the compounds of the following formulae



wherein Y represents halogen, R^1 represents C_1–C_4 alkylene and R^2 represents C_1–C_4 alkyl, C_1–C_4 alkoxy-C_1–C_4 alkyl or C_1–C_4 alkoxy-C_1–C_4 alkoxy-C_1–C_4 alkyl.

4,116,624

NEW HEAVY METAL COMPLEX DYES, PROCESS FOR THEIR MANUFACTURE AND USE THEREOF

Otto Bitterlin, Basel, and Fabio Beffa, Riehen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

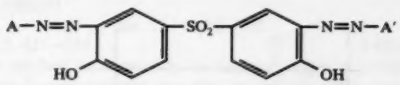
Filed Nov. 1, 1976, Ser. No. 737,932

Claims priority, application Switzerland, Nov. 18, 1975, 14919/75

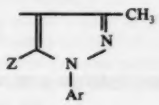
Int. Cl.[2] C09B *45/00;* D06P *1/10*

U.S. Cl. 8—42 B 3 Claims

1. In a process for dyeing and printing natural or synthetic polyamide materials, the improvement wherein the dyestuff is a cobalt, chromium, copper, iron or nickel metal complex of an azo dye of the formula



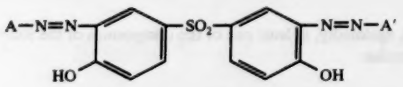
wherein each of A and A′ represents a radical of the formula



where Z is —OH or —NH_2, and

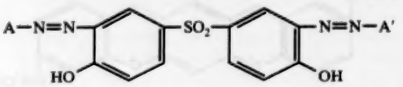
Ar is sulfophenyl which is unsubstituted or substituted by halo, alkyl or alkoxy.

2. In a process for dyeing and printing natural or synthetic polyamide materials, the improvement wherein the dyestuff is a cobalt, chromium, copper, iron or nickel metal complex of an azo dye of the formula

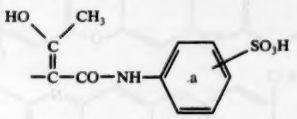


wherein each of A and A′ represents the radical of hydroxynaphthalenemono-or-disulfonic acid.

3. In a process for dyeing and printing natural or synthetic polyamide materials, the improvement wherein the dyestuff is a cobalt, chromium, copper, iron or nickel metal complex of an azo dye of the formula



wherein each of A and A′ represents a radical of the formula



wherein the ring *a* is further unsubstituted or substituted by chloro or bromo, or by low molecular alkyl or alkoxy.

4,116,625

PROCESS FOR MODIFYING FIBROUS PRODUCTS CONTAINING CELLULOSIC FIBERS

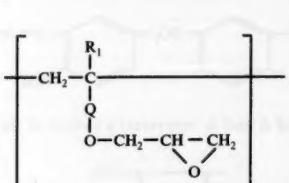
Kazuhide Yamamoto, Uji, Japan, assignor to Daido-Maruta Finishing Co., Ltd., Kyoto, Japan

Filed Sep. 22, 1976, Ser. No. 725,621
Claims priority, application Japan, Sep. 30, 1975, 50-117164
Int. Cl.[2] D06M *15/38*; B05D *3/00*
U.S. Cl. 8—120 **42 Claims**

1. A process for modifying a fibrous product containing cellulosic fibers which comprises treating said fibrous product with a solution or dispersion containing a glycidyl-containing copolymer consisting essentially of

(a) 1 to 55 mole% of at least one structural unit of the formula

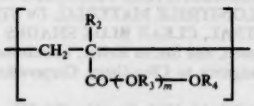
(I)



wherein R_1 represents a hydrogen atom or a methyl group, and Q is CO or CH_2,

(b) 0.5 to 25 mole% of at least one structural unit of the formula

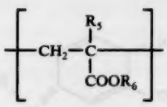
(II)



wherein R_2 represents a hydrogen atom or a methyl group, R_3 represents an alkylene group, R_4 represents a hydrogen atom, an alkyl group, an acryloyl group or a methacryloyl group, and *m* is an integer of at least 1, and

(c) 98.5 to 20 mole% of at least one structural unit of the formula

(III)

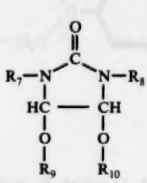


wherein R_5 represents a hydrogen atom or a methyl group, and R_6 represents an alkyl or hydroxyalkyl group;

drying the fibrous product; and heat-treating it in the presence of an acid catalyst at a temperature sufficient to cleave the oxirane linkage of the glycidyl group.

10. The process of claim 1 wherein said solution or dispersion further contains an imidazolidinone derivative of the formula

(VII)



wherein R_7 and R_8, independently from each other, represent a hydrogen atom, an alkyl group, a hydroxyl group, or an alkyl group substituted with a cyano, carboxy, lower alkoxy carbonyl or carbamoyl group, and R_9 and R_{10}, independently from each other, represent a hydrogen atom, an alkyl group, or an acyl group.

4,116,626

PRINTING OF PATTERN DESIGNS WITH COMPUTER CONTROLLED PATTERN DYEING DEVICE

George Clifford Varner, Moore, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed May 17, 1976, Ser. No. 686,900
Int. Cl.[2] D06B *1/02, 11/00*
U.S. Cl. 8—149 **18 Claims**

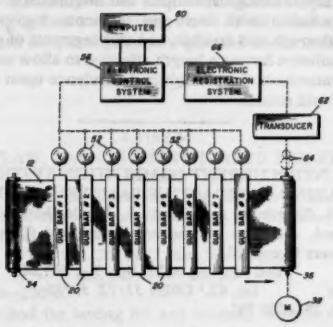
1. A method of providing first and second different complete patterns on a material, each of said complete patterns including at least two colors, comprising:

(a) moving the material in a path of travel;

(b) forming a number of repeats of the first complete pattern on the material;

(c) simultaneously completing the formation of the final repeat of the first complete pattern and starting the forma-

tion of a first repeat of the second complete pattern on the material; and



(d) forming a number of repeats of the second complete pattern on the material.

4,116,627

METHOD FOR SEALING A HIGH PRESSURE STEAMER AND AN APPARATUS FOR CARRYING OUT THE SAME

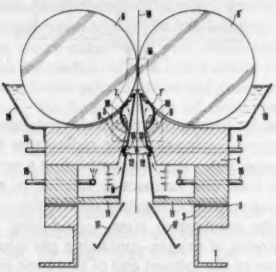
Yoshikazu Sando, and Hiroshi Ishidoshiro, both of Wakayama, Japan, assignors to Sando Iron Works Co., Ltd., Japan

Filed Jun. 13, 1977, Ser. No. 806,058

Claims priority, application Japan, Jun. 16, 1976, 51-70839; Jun. 16, 1976, 51-70840

Int. Cl.[2] D06B *23/18*

U.S. Cl. 8—149.3 8 Claims



1. A method of sealing the inlet or outlet of a high-pressure steamer in which a textile article is treated by a fluid medium under high pressure and high temperature conditions with the textile article passing between a pair of mutually contacting seal rolls as it enters or exits the steamer, comprising the steps of forming a first air passage laterally enclosing a second air pressure with the air passages extending between the seal rolls and the inlet to or outlet from the steamer and the first and second passages being in fluid flow communication at the ends thereof adjacent the seal rolls, flowing air at a pressure higher than the pressure within the steamer and at a temperature at or below room temperature into the first air passage at a location spaced from the seal rolls and directing the flow of air through the first air passage into the space between the seal rolls adjacent the mutually contacting portions thereof, reversing the direction of flow of air into the end of the second passages adjacent the seal rolls and directing the flow of air through the second passage toward the steamer, admitting the fluid medium from the steamer into the adjacent end of the second passage, colliding the flow of air and the fluid medium within the second passage intermediate the ends thereof, and discharging at least a part of the flow of air through the second passage at a location spaced from both the opposite ends of the second passage.

3. Apparatus for sealing the inlet or outlet of a high pressure steamer in which a textile article is treated by a fluid medium under high pressure and high temperature conditions, comprising a high pressure steamer drum body having an opening for passing the textile article into or out of the drum body, wall means secured to said drum body forming a laterally closed passage communicating with and extending outwardly from the opening in said drum body, the passage having a first open end at the opening in said drum body and a second open end spaced outwardly from said drum body, a pair of seal rolls in contacting relation mounted on said wall means and forming a closure for the second end of said passage, a duct positioned in said passage and having a first end adjacent to the opening in said drum body and a second end adjacent and spaced closely inwardly from the contacting portions of said seal rolls, said duct spaced inwardly from the surface forming said passage and in combination therewith forming an annular first flow path about said duct, said duct forming a second flow path between the first and second ends thereof, said duct secured to one of said means and said drum body and forming a closure for the first flow path at the end thereof adjacent said drum body, the first and second flow paths being in fluid flow communication at the ends thereof adjacent said seal rolls, said wall means having an inlet aperture therein opening into the first flow path and spaced from both said seal rolls and said drum body for supplying air under pressure into the first flow path so that the air can flow toward the contacting portions of said seal rolls where its continued flow in that direction is blocked by the contacting portions of said seal rolls and the flow of air reverses direction and streams into the second flow path toward said drum body with the flow of air contacting the fluid medium from said drum body in the second flow passage, and means connected to said duct intermediate the ends thereof and extending exteriorly of said wall means for discharging at least a part of the flow of air streaming through the second flow path within said duct to a point exteriorly of the apparatus.

4,116,628

POWDERY PEARLESCENT PIGMENT COMPOSITION

Reiner Hesse; Hans Pratzer; Manfred Kieser, and Gerhard Edler, all of Darmstadt, Germany, assignors to E. Merck, Germany

Filed Jan. 27, 1977, Ser. No. 763,157

Claims priority, application Fed. Rep. of Germany, Jan. 29, 1976, 2603211

Int. Cl.[2] C09C *1/00*

U.S. Cl. 427—154 5 Claims

1. A method for increasing the resistance of flaky or plate-like pearlescent pigment particles to agglomeration and to mechanical stresses and decreasing loss of luster or luminosity of the pigment particles during handling or shipment in dry powder form, comprising the steps of

(a) combining a suspension of flaky or plate-like pearlescent pigment particles with a solution of a solid polymer;

(b) depositing the solid polymer on individual pigment particles and thereby coating the individual pigment particles with said polymer; and

(c) after said handling or shipment, removing the coating formed in step (b) from the pigment particles.

4,116,629

CORROSION INHIBITION OF STAINLESS STEEL EXPOSED TO HOT CARBONATES

Alan Brian Gancy, Syracuse, and Robert Edward Durling, Camillus, both of N.Y., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed May 31, 1977, Ser. No. 801,947
Int. Cl.[2] C23F *11/06, 11/18*
U.S. Cl. 422—13 13 Claims

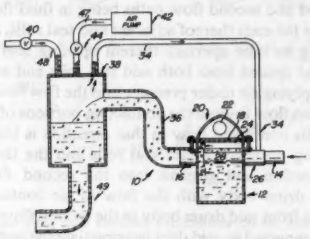
1. The method for the inhibition of corrosion of martensitic or ferritic stainless steel being contacted with aqueous hot alkali metal carbonate solutions which comprises contacting such stainless steel with an inhibiting amount of nickel ion.

4,116,630

STERILIZATION METHOD

Thomas E. Meacham, Jr., Philadelphia, and David C. Johnson, Ambler, both of Pa., assignors to Refreshment Machinery Incorporated, Warminster, Pa.

Division of Ser. No. 699,026, Jun. 23, 1976. This application Nov. 30, 1977, Ser. No. 855,650
Int. Cl.[2] A61L *3/00*
U.S. Cl. 422—24 6 Claims



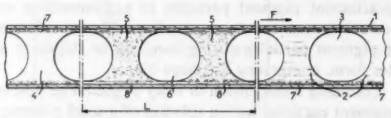
1. A method of sterilizing a liquid by radiation comprising flowing a liquid to be sterilized through a sterilization chamber, providing a window transparent to sterilizing radiation to define the upper end of said chamber, providing an air pocket between said window and said liquid to prevent direct contact between the liquid and said window, sterilizing the liquid by sterilizing radiation which passes through said window and air pocket to the liquid while the liquid is flowing through the chamber, locating said window between a source of radiation and the liquid in said chamber, and introducing air into the liquid to maintain said air pocket in said chamber.

4,116,631

METHOD FOR MICROBIOLOGICAL ANALYSIS OF LIQUID MEDIUMS

Pierre-Andre Trinel; Henri Leclerc, both c/o Inserm Unite 146 Certia 369, rue Jules-Guesde, 59650 Villeneuve-d'Ascq, and Yves Moschetto, c/o Centre de Technologie Biomedicale Inserm, 13 rue Camille Guerin, 59000 Lille, all of France

Filed Feb. 10, 1977, Ser. No. 767,314
Claims priority, application France, Feb. 19, 1976, 76 05166
Int. Cl.[2] G01N *1/18, 21/26, 33/16*
U.S. Cl. 23—230 B 4 Claims



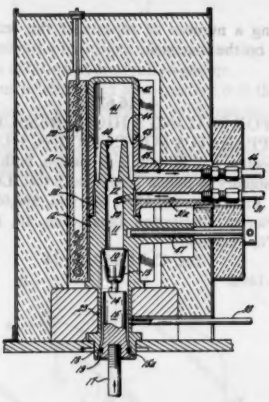
1. A method of transporting liquid samples for microbiological analysis in an automatic analysis apparatus comprising, spacing apart in a fluid stream in a conduit successive liquid biological samples by intermediate segments of a decontamination solution effective to decontaminate the conduit of bacteria in the next preceeding sample to insure freedom of contamination from one sample to the other, said spacing including spacing the liquid biological samples and intermediate decontamination solution with inert gas segments, transporting the stream through said conduit, and said segments of decontamination solution having a length effective to allow said solution to decontaminate the conduit in dependence upon the rate of flow of said stream.

4,116,632

COUNTERCURRENT COMBUSTION SYSTEM FOR PREPARING RADIOACTIVE SAMPLES AND THE LIKE

Niilo H. Kaartinen, and Pentti J. Juhala, both of Kuusisto, Finland, assignors to Packard Instrument Company, Inc., Downers Grove, Ill.

Filed May 31, 1977, Ser. No. 801,861
Int. Cl.[2] G01N *31/12, 33/16*
U.S. Cl. 23—230 PC 18 Claims



1. A process for combusting materials containing radioactive nuclides to permit recovery of the radioactive nuclides, said process comprising the steps of combusting a sample material containing at least one radioactive nuclide in a combustion zone while continuously exhausting combustion products from one end of the combustion zone, introducing a continuous pressurized stream of oxygen-containing gas into the combustion zone between the exhaust end of said zone and the sample during the combustion thereof, and directing at least a portion of the pressurized oxygen-containing gas stream through the combustion zone in a spiral path toward said sample to circulate at least a portion of the combustion products around the combustion zone as they flow towad the exhaust end of said zone counter to the flow of the spiraling stream of oxygen-containing gas, whereby said combustion products are intimately mixed with said oxygen-containing gas in said combustion zone.

4,116,633

GLOBULIN TEST

Abdus Salam Mia, Fairless Hills, Pa., assignor to Pitman-Moore, Inc., Washington Crossing, N.J.

Filed Aug. 22, 1977, Ser. No. 826,498
Int. Cl.[2] G01N *33/16*
U.S. Cl. 23—230 B 9 Claims

8. A method for the determination of serum globulin comprising:

a. mixing a minor amount of serum containing globulin with a reagent comprising ethyl acetate, ferric ion, sulfuric acid, acetic acid and at least 15% v/v water; and

b. heating the mixture to a temperature from about 85° C. to

about 100° C. for a period of from about 5 minutes to about 25 minutes; and

c. determining the concentration of globulin by photometrically measuring color absorbance and comparing the reading against a calibration curve or the absorbance of a standard sample with known globulin concentrations.

4,116,634
VOID, FLAW, AND CRACK INDICATOR FOR EPOXY BONDS

Vernon A. Nieberlein, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 26, 1977, Ser. No. 836,327
Int. Cl.² G01N *21/16*
U.S. Cl. 23—230 R **3 Claims**

1. A method for testing for and locating imperfections including voids, bubbles, cracks, and flaws having an opening to a surface of cured epoxy resin of a cured epoxy resin article comprising completing the steps of:

(i) providing a cured epoxy resin article to be tested, said cured epoxy resin selected from the group consisting of an epoxy resin that is cured with an amine curing agent which results in alkaline characteristics in said amine cured epoxy resin and a cured epoxy resin that is cured with a carboxy-terminated polymeric curing agent which results in acidic characteristics in said carboxy-terminated polymeric cured epoxy resin;

(ii) adding to the surface of said cured epoxy resin article an indicator solution selected from the group consisting of a 0.1 percent alcoholic solution of bromcresol purple, bromthymol blue, thymol blue, meta-cresol purple, xylenol blue, aurin, methyl violet, lacmoid, resazurin, and mixtures thereof when testing for and locating imperfections in epoxy resins cured with said amine curing agent or adding to the surface of said cured epoxy resin article an indicator solution selected from the group consisting of a 0.1 percent alcoholic solution of congo red, p-sulfo-o-methoxybenzene, azodi-methyl-alpha-naphthylamine, and mixtures thereof when testing for and locating imperfections in epoxy resins cured with said carboxy-terminated polymeric curing agent;

(iii) examining said cured epoxy resin article to which said selected indicator solution has been added for evidence of penetration by said indicator a site of imperfection wherein the surface of said imperfection is dyed a color that is characteristic of said indicator solution for the alkaline or acid characteristic of said cured epoxy resin at the site of imperfection, said dyed surface of an imperfection rendering a previously inconspicuous imperfection visible which serves to locate and identify the imperfection in said cured epoxy resin article.

4,116,635
GENERAL PURPOSE IN VITRO ANTICOAGULANT

Mark A. Jaeger, 110 Betty Jean La., Lemay, Mo. 63125

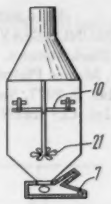
Filed Mar. 14, 1977, Ser. No. 777,147
Int. Cl.² G01N *33/16*
U.S. Cl. 23—230 B **10 Claims**

1. In a process for testing a sample of blood for coagulation, hematology, chemistries, enzymes, electrolytes, and trace metals wherein said sample is introduced into a vessel containing an anticoagulant, the improvement comprising selecting for the anticoagulant a calcium chelating agent having a Log K′ from about 3.4 to about 4.2, where Log K′ is the logarithm of the conditional stability constant at pH 7.5.

4,116,636
APPARATUS FOR ISOLATION OF TRICHINELLA LARVAE

Andrei Stefanovich Bessonov, B. Cheremushkinskaya ulitsa, 20, korpus 3, kv. 137; Alexandr Vitalievich Uspensky, Nagornaya ulitsa, 45, korpus 24, kv. 74, and Nikolai Vasilievich Shekhovtsov, ulitsa Krzhizhanovskogo, 7, korpus 3, kv. 23, all of Moscow, U.S.S.R.

Filed Apr. 29, 1977, Ser. No. 792,442
Int. Cl.² G01N *33/12*
U.S. Cl. 422—101 **6 Claims**



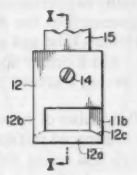
1. An apparatus for isolation of trichinae by artificial digestion of muscle tissues, comprising a vessel intended for filling with a digesting liquid and the sample;

said vessel has upper and lower parts, the lower part being made in the form of a funnel, a settling vessel connected to the narrow outlet of said funnel, a means preventing penetration of non-digested parts of the sample into the said settling vessel, and a means for stirring the vessel contents.

4,116,637
BLOOD SERUM APPLICATOR

Tomohiro Kitahara, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed Jan. 14, 1977, Ser. No. 759,557
Claims priority, application Japan, Jan. 16, 1976, 51/2499
Int. Cl.² B01L *3/00*; G01N *1/12, 31/06, 33/16*
U.S. Cl. 422—63 **5 Claims**



1. A blood serum applicator, comprising:

a first vertically short, laterally thin, longitudinally long horizontal plate-like straight portion having a flat lower edge which extends from one end thereof to an opposite end thereof;

a second vertically short, laterally thin, longitudinally long horizontal plate-like straight portion having a flat lower edge which extends from one end thereof to an opposite end thereof;

said first and second straight portions being disposed laterally adjacent one another with a constant-width space therebetween and said flat lower edges at an equal level;

main body means space vertically above said first and second straight portions;

a first, one vertically tall, laterally thin, longitudinally horizontally short plate-like supporting portion fixedly integrated with said first straight portion and with said main body means, and constituting the sole means mounting the first straight portion to said main body means;

a second, at least one and no more than two vertically tall,

laterally thin, longitudinally horizontally short plate-like supporting portion fixedly integrated with said second straight portion and with said main body means, and constituting the sole means mounting the second straight portion to said main body means;

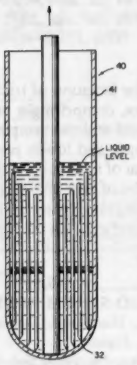
no part of said first, one supporting portion laterally confronting any part of said second at least one supporting portion, so that blood serum, when carried in said constant width space has no part thereof carried between said first, one supporting portion and said second at least one supporting portion.

4,116,638

IMMUNOASSAY DEVICE

Michael B. Kenoff, Hackettstown, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Mar. 3, 1977, Ser. No. 774,190
Int. Cl.[2] G01N *33/16*
U.S. Cl. 422—99 **2 Claims**



1. A device for carrying out solid phase immunoassays comprising:

a disk having a plurality of apertures of substantially uniform diameter complimentary to the diameter of the exterior diameter of a capillary tube and said apertures extending through said disc and a center aperture centrally located in said disc and having a greater diameter than the other apertures;

a plurality of capillary tubes of substantially uniform length being maintaind in a spaced relationship to one another by extending through and being held in a number of the plurality of apertures by friction fit; and

a tubular member extending through and being frictionally held in the centrally located aperture, said member having a length and a diameter respectively greater than those of said capillary tubes.

4,116,639

METHOD AND APPARATUS FOR THE PRODUCTION OF CARBON BLACK FROM LIQUID OR GASEOUS HYDROCARBONS

Arthur E. Fross, Basel, Switzerland, assignor to Etablissement Gelan, Vaduz, Liechtenstein

Continuation of Ser. No. 633,035, Nov. 18, 1975, abandoned, which is a division of Ser. No. 412,599, Nov. 5, 1973, abandoned. This application May 2, 1977, Ser. No. 792,991
Claims priority, application Switzerland, Nov. 10, 1972, 16415/72; Aug. 31, 1973, 12573/73
Int. Cl.[2] C09C *1/48*
U.S. Cl. 422—111 **27 Claims**

1. Apparatus for production of carbon black by thermal decomposition of a supplied hydrocarbon material through partial combustion of the same hydrocarbon reagent material with a free-oxygen-containing reagent gas following preliminary heating and mixing of the reagents, comprising:

a chamber (1) having an entry end and an exit end respectively at opposite ends of a straight axis of the chamber;

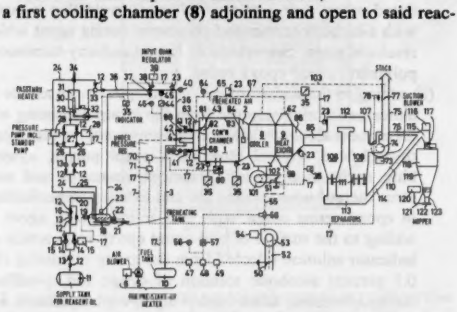
means for heating the chamber up from a cold condition to a reaction start temperature not less than 900° C;

means for supplying or removing heat respectively to and from said reaction chamber through a thermally conducting partition and means for controlling heat supplying and removing means so as to keep the temperature of said reaction chamber between preset limits lying above 900° and below 1,200° C.;

a header (81) extending over the full cross-section of the entry end of said reaction chamber and providing a plurality of ante-chambers (82) distributed over the cross-section of the reaction chamber, said ante-chambers having axes parallel to said reaction chamber axis, at one end of which axes they open out into said reaction chamber and at the other end of which axes they are fitted with means for admitting a reagent gas and adjustable means (43) for atomizing a liquid reagent, each of said ante-chambers having a cross-section increasing towards its end that opens into said reaction chamber;

means (11-22, 24-34, 36, 41, 42, 88) for supplying liquid hydrocarbon material under pressure and distributing said pressurized liquid hydrocarbon material to said atomizing means of said respective ante-chambers;

a first cooling chamber (8) adjoining and open to said reaction chamber on the exit end of the latter and having coolant flow ducts in thermal exchange with said chamber and means for varying the flow of coolant there-through so as to maintain the temperature of discharge of reaction products at a point downstream of said first cooling chamber within a desired temperature range;



a second cooling chamber (9) adjoining and open to the exit end of said first cooling chamber and having flow ducts in thermal exchange with said second cooling chamber for preheating a gas reagent, said flow ducts being connected to a reagent gas supply duct the other end of which is connected to a reagent gas distribution box (63) mounted on said header, the space enclosed by which communicates with said means for admitting a reagent gas to said ante-chambers provided by said header;

carbon black separating apparatus (108-123) connected to the exit end of said second cooling means for receiving the cooled output of said second cooling chamber (9) and comprising a preliminary separator of the flow-pattern influence type and a final separator (109) of the porous filter type, and

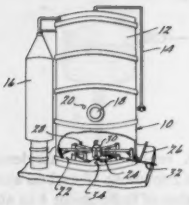
a system for controlling the ratio of the respective rates of supply of a liquid hydrocarbon reagent and of a combustion-supporting gas reagent to said ante-chambers and said reaction chamber, having means for measuring the rate of supply of each of said reagents and means for adjusting the rate of at least one of said reagents so as to maintain it at least approximately at a predetermined ratio to the rate of supply of the other.

4,116,640

SALT DISSOLVER

Melvin E. Leverenz, St. Clair, Mich., assignor to Diamond Crystal Salt Company, St. Clair, Mich.

Filed Feb. 24, 1977, Ser. No. 771,460
Int. Cl.[2] B01D *11/02;* C01D *3/04*
U.S. Cl. 422—264 9 Claims



1. A bulk salt dissolver for producing saturated salt solutions comprising a tank having a base and defining an upright internal chamber adapted to be at least partly filled with a particulated salt charge, a sparger assembly comprising a conduit disposed adjacent to said base and provided with a plurality of nozzles disposed at spaced intervals therealong for introducing liquid into said chamber, a collector manifold disposed above and adjacent to said sparger assembly for withdrawing a filtered salt solution from said chamber, said collector manifold comprising a collector chamber supported by said base and positioned at substantially the center thereof, at least a portion of said nozzles in said conduit angularly oriented to discharge liquid toward a region spaced immediately above said collector manifold, a plurality of elongated foraminous collector conduits extending outwardly from said collector manifold in a substantially horizontal direction above said sparger assembly toward the periphery of said tank, each collector including coupling means on one end thereof for removably connecting each conduit in communication with the interior of said collector chamber, a tubular cylindrical sleeve of substantially circular cross section comprised of a porous filter medium disposed with the inner surface of said sleeve in overlying spaced relationship around each of said collector conduits, retaining means for applying an axial clamping force against opposite ends of each said sleeve for removably retaining said sleeve in appropriate sealed and spaced position around said collector conduit, support means for removably supporting each said collector conduit and tubular sleeve in spaced relationship from said base enabling replacement of said tubular sleeve in response to uncoupling of said coupling means, and an outlet conduit connected to said collector chamber for withdrawing a salt solution from said manifold assembly to a location exteriorly of said tank.

4,116,641

APPARATUS FOR PULLING CRYSTAL RIBBONS FROM A TRUNCATED WEDGE SHAPED DIE

Theodore Frank Ciszek, Salt Point, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 16, 1976, Ser. No. 677,579
Int. Cl.[2] B01J *17/18;* C01B *33/02*
U.S. Cl. 422—246 7 Claims

1. Apparatus for forming an elongated crystalline ribbon-shaped body comprising:

means for providing a substantially constant source of molten material;

a generally truncated wedge shaped die having an elongated capillary therein positioned partially submerged in said molten material so that the molten material moves into said capillary;

the top surface of said die being shaped so that it is thickest at the center and symmetrically curving to narrower ends;

the said top surface of said die being substantially perpendicular to the plane of ribbon-shaped body greater in height at its ends and decreasing in height to a lowest point at the center of said die; and

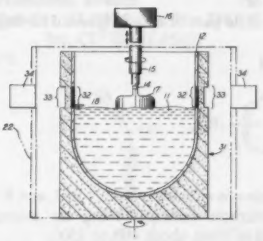
means for growing and pulling said body from said capillary.

4,116,642

METHOD AND APPARATUS FOR AVOIDING UNDESIRABLE DEPOSITS IN CRYSTAL GROWING OPERATIONS

Tze Yao Chu, Trenton, N.J.; Yogesh Jaluria, Kanpur, India; Robert Joseph Lavigna, Bath, Pa.; Raymond Edward Reusser, Bethlehem, Pa., and George Williams, Mercerville, Pa., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Dec. 15, 1976, Ser. No. 750,985
Int. Cl.[2] B01J *17/00;* C01B *33/02*
U.S. Cl. 422—249 9 Claims



1. Apparatus for Czochralski crystal growing comprising:

a crucible for containing a material from which a melt is produced;

a housing surrounding and supporting the crucible and for transmitting heat thereto;

means for heating the housing to heat the material in the crucible to a temperature at which it melts;

means for supporting and pulling a crystal of the material with respect to the melt; and

the combination of the crucible, housing and heating means cooperating with additional means, including an annular portion of reduced thickness in the housing located adjacent the crucible just above the melt surface to provide less resistance to the transmission of heat to the crucible, such additional means providing supplemental, locally intensified heating to an inner annular portion of the crucible, which is located just above the melt surface, sufficiently to avoid undesired formations of any material on said portion, including inwardly projecting deposits.

4,116,643

AMINE SALTS OF CARBOXYLATE HALF ESTERS OF 1-AZA-3,7-DIOXABICYCLO [3.3.0] OCT-5-YL METHYL ALCOHOLS, THEIR PREPARATION AND USE AS ADDITIVES FOR GASOLINE AND MIDDLE DISTILLATE FUELS

Jack Ryer, East Brunswick; Stanley J. Brois, Westfield, and Esther D. Winans, Colonia, all of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 752,872, Dec. 20, 1976, which is a division of Ser. No. 573,545, May 1, 1975, Pat. No. 4,017,406. This application Jul. 11, 1977, Ser. No. 814,161

Int. Cl.[2] C10L *1/22*

U.S. Cl. 44—63 **11 Claims**

1. A fuel composition comprising a major amount of liquid hydrocarbon fuel and in the range of about 0.001 to 0.5 wt.% of a fuel soluble amine salt-ester wherein said amine contains from 1 to 3 nitrogens and from 2 to 12 carbons and said ester is the half ester reaction product of: (a) about 1 molar proportion of a hydrocarbyl substituted C_4 to C_{10} dicarboxylic acid or anhydride having about 2 to about 50 carbon atoms per hydrocarbyl group partly esterified with the reaction product of (b) either about 1 or 2 molar proportions of an aldehyde, or one molar proportion of ketone and one molar proportion of aldehyde, reacted with about 1 molar proportion of tris-(hydroxymethyl) aminomethane; said half ester reaction product having a 1-aza-3,7-dioxabicyclo[3.3.0] octyl ring.

4,116,644

GASOLINE COMPOSITIONS

Philip F. Jackisch, 4218 Rosewold, Royal Oak, Mich. 48073, and Calvin J. Worrel, 20075 Houghton, Detroit, Mich. 48219

Continuation-in-part of Ser. No. 561,371, Mar. 24, 1975, abandoned. This application Jan. 31, 1977, Ser. No. 764,214

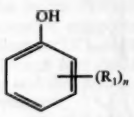
Int. Cl.[2] C10L *1/24*

U.S. Cl. 44—73 **6 Claims**

1. A concentrate for use in liquid hydrocarbon fuel boiling in the gasoline boiling range containing

(I) from about 35 to about 50 weigh percent of the reaction product of:

(A) one mole part of an alkylphenol having the formula:



wherein *n* is an integer from 1 to 2, and R^1 is an aliphatic hydrocarbon radical having an average molecular weight of from about 400 to 1500;

(B) from 1-5 mole parts of an aldehyde having the formula:

wherein R_2 is selected from hydrogen and alkyl radicals containing 1-6 carbon atoms; and

(C) from 0.5-5 mole parts of an amine having at least one active hydrogen atom bonded to an amino nitrogen atom, and

(II) from about 1.4 to about 5.6 weight percent of a demulsifying agent containing:

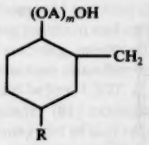
(A) at least one oil-soluble amine, ammonium, alkaline earth metal, or alkali metal salt of an aryl sulfonic acid;

(B) at least one oil-soluble polyether characterized by the presence within its structure of a group of the formula:

$$\text{—O—A—}_x$$

wherein A is an alkylene group containing from 2 to about 7 carbon atoms and where *x* has an average value of from about 5 to about 200; and

(C) oxyalkylated phenol formaldehyde resin of the formula



wherein A represents an alkylene group containing from about 2 to about 10 carbon atoms, where *m* has an average value of from about 4 to about 200, and where R is an alkyl group of about from 1 to about 20 carbon atoms,

(III) from about 20 to about 25 weight percent of a mononuclear or dinuclear aromatic hydrocarbon solvent,

(IV) from about 20 to about 35 weight percent of an alkanol having from 4 to 10 carbon atoms, and

(V) from about 3 to about 5 weight percent of a corrosion inhibitor.

4,116,645

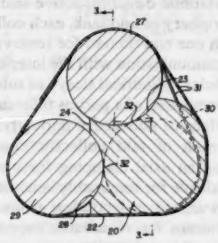
SOLID FUEL PACKAGE WITH IGNITER

Charles J. Dalzell, 940 N. 6th Ave., Yakima, Wash. 98902

Filed Nov. 11, 1976, Ser. No. 740,943

Int. Cl.[2] C10L *11/00*

U.S. Cl. 44—38 **4 Claims**

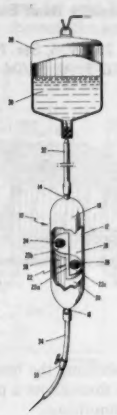


1. A solid fuel assembly comprising a unitary igniter and cradle element having a substantially flat bottom face adapted to rest on a level support surface and having substantially vertical end faces, said igniter and cradle element having an interior side provided with a log positioning arcuate recess and also having a top leg positioning arcuate recess above said side recess, an upper log whose length defines the length of said assembly resting stably in the upper arcuate recess of said igniter and cradle element, a lower log engaging in the side arcuate recess and positioned and stablized thereby relative to the upper log, and being of substantially the same length as the upper log, the bottom of the lower log being substantially flush with said flat bottom face of the igniter and cradle element, and a pair of log slices of considerably shorter lengths than the lengths of said upper and lower logs and disposed on opposite sides of said igniter and cradle element in spaced relation to said vertical end faces of such element and forming therewith a pair of spaced draft passages between said log slices and said igniter and cradle element, said side and top log positioning arcuate recesses maintaining said upper and lower logs in spaced substantially parallel relationship in said assembly and thereby forming a longitudinal draft passage in the assembly communicating with said pair of draft passages.

4,116,646
FILTER UNIT

James H. Edwards, Winchester, Mass., assignor to Millipore Corporation, Bedford, Mass.

Filed May 20, 1977, Ser. No. 798,934
Int. Cl.[2] B01D *19/00*; A61M *5/16*
U.S. Cl. 55—159 21 Claims



1. A filter unit designed to have, when in operation, a vertical axis,
said unit having an upper chamber and a lower chamber along said axis,
a hydrophilic filter separating said chambers,
a hydrophobic membrane separating said chambers and in operation lower along said axis than said hydrophilic filter,
a gas reservoir in the lower chamber above the membrane and below the filter, and
a liquid reservoir in the upper chamber above the membrane and below the filter,
whereby in operation liquid is trapped in the liquid reservoir and gas is trapped in the gas reservoir.

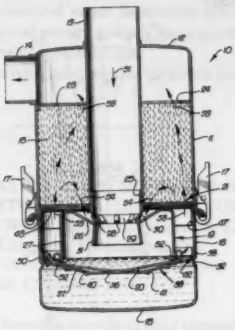
8. A filter unit having a liquid inlet chamber and a liquid outlet chamber,
a hydrophilic filter means mounted between said chambers to filter any liquid flow from said inlet chamber to said outlet chamber,
a hydrophobic membrane means mounted between said chambers to vent and pass excess gas from said outlet chamber to said inlet chamber,
in the normal orientation of said holder during operation, said hydrophilic filter means being at a higher elevation than that of said hydrophobic membrane means,
a liquid reservoir in said inlet chamber above said hydrophobic membrane means, and
a gas reservoir in said outlet chamber below said hydrophilic filter means.

4,116,647
AIR CLEANER

Herman H. Garner, Claremont, Calif., assignor to Vortox Company, Claremont, Calif.

Continuation of Ser. No. 664,551, Mar. 8, 1976, abandoned. This application Mar. 28, 1977, Ser. No. 781,883
Int. Cl.[2] B01D *47/02*
U.S. Cl. 55—223 2 Claims

1. In an air cleaner of the oil-bath type, the combination of:
(a) outer shell means defining an upper filter chamber and cup means connected to said shell means defining a lower reservoir;
(b) a filter in said filter chamber and oil filling said reservoir to a static oil level;
(c) air inlet means extending downwardly through said filter chamber toward said reservoir and terminating in a lower end portion above said static oil level;
(d) venturi means encircling said lower end portion of said air inlet means, above said static oil level, for drawing oil from said filter chamber and for spraying such oil into the

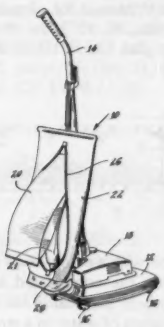


air flowing downwardly through said lower end portion of the air inlet means, at a level above said static oil level; and;
(e) air outlet means connected to said shell means and in communication with said filter chamber.

4,116,648
MULTI-LAYER FILTER DUST BAG FOR A VACUUM CLEANER

Charles R. Busch, Mishawaka, Ind., assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Oct. 27, 1976, Ser. No. 736,147
Int. Cl.[2] B01D *46/00*
U.S. Cl. 55—276 9 Claims



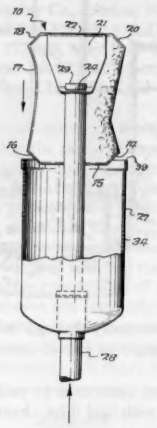
1. A multi-layer disposable filter bag for a vacuum cleaning apparatus used in hospitals or other health care facilities, said vacuum cleaning apparatus having an air discharge outlet, said filter bag comprising: at least two concentric and spaced air-pervious paper layers, a fibrous filter non-woven batt of glass fiber impregnated with a binder resin positioned in the space between said concentric layers, and an air-impervious connection from said filter bag to said discharge outlet whereby said discharged air flows in a path through the inner air-pervious layer, said fibrous filter non-woven batt and said outer air pervious layer.

4,116,649

SELF-RETAINING ADSORBENT BAG UNIT

John S. Cullen, Buffalo, and Paul W. Huber, Lancaster, both of N.Y., assignors to Multiform Desiccant Products, Inc., Buffalo, N.Y.

Filed Jan. 16, 1976, Ser. No. 649,586
Int. Cl.[2] B01D *39/00*
U.S. Cl. 55—387 33 Claims



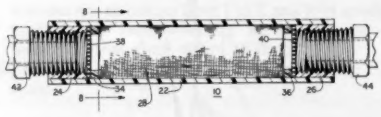
1. An adsorbent unit for mounting on the outside of a conduit comprising a container, adsorbent in said container, said container having a peripheral edge portion and a central portion, a flexible flap having first and second spaced portions, attaching means attaching said first portion proximate said peripheral edge portion with said flap extending toward said central portion, and securing means on said second portion for mounting said flap on the outside of a conduit.

4,116,650

DEVICE FOR PREVENTING CIRCULATION OF LIQUID WATER ENTRAINED IN COMPRESSED AIR

Arlo E. Lane, 2416 Wildwood Rd., Reading, Mich. 49274

Filed Mar. 30, 1977, Ser. No. 782,978
Int. Cl.[2] B01D *53/04*
U.S. Cl. 55—387 5 Claims



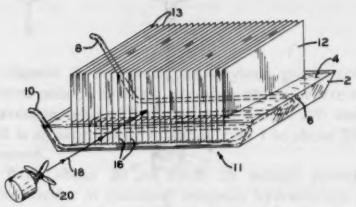
1. In combination with a compressed air line, a tubular container in series with the compressed air line and a plug of porous water absorbent material in the tubular container, the plug absorbing droplets of water in a stream of compressed air passing through the tubular container and providing a surface from which the water evaporates into the compressed air stream as the compressed air passes through the plug, the tubular container including a cylindrical body, the plug being in a central portion of the body, retaining ring members mounted in the body at opposite ends of the plug, perforated transverse members extending transversely of the body outboard of the retaining ring members, internally threaded insert members mounted in the body outboard of the perforated transverse members, the insert members preventing outward movement of the perforated transverse members to limit movement of the plug lengthwise of the body, and means for connecting end portions of sections of the compressed air line to the insert members.

4,116,651

HEAT SINK TEMPERATURE STABILIZED EVAPORATOR COIL

Glenn E. Rickert, Community Bank Building, Huntington, Ind. 46750

Filed Aug. 23, 1976, Ser. No. 716,789
Int. Cl.[2] F25D *3/00, 17/04, 11/00, 3/10*
U.S. Cl. 62—59 2 Claims



1. The method of stabilizing the temperature of a refrigeration system evaporator throughout a plurality of cycles of the refrigeration system comprising:

energizing the system to cool the evaporator;

passing air across the evaporator to cool the air and condense excess moisture therefrom;

retaining at least part of the condensate in good heat transfer relation with the evaporator;

continuing operation of the system to freeze the thus retained condensate;

deenergizing the system while continuing to pass air across the evaporator until at least a portion of the frozen condensate has changed back to a liquid phase; and

reenergizing the system to again cool the evaporator and refreeze the retained condensate when the temperature of the air passing across the evaporator coil exceeds a preferred dew point temperature to thereby maintain the temperature of the air passing across the evaporator coil generally below that preferred dew point temperature.

4,116,652

PROCESS FOR THE FREEZE CONCENTRATION OF SOLUTIONS

Klaus Zondek, Casilla 10012, Santiago, Chile

Continuation-in-part of Ser. No. 486,369, Jul. 8, 1974, abandoned, Ser. No. 309,689, Nov. 27, 1972, abandoned, and Ser. No. 170,249, Aug. 9, 1971, abandoned. This application May 17, 1976, Ser. No. 686,808
Int. Cl.[2] B01D *9/04*
U.S. Cl. 62—534 9 Claims

1. A process for concentrating a solution and for separating crystallizable components from a solution thereof which comprises

introducing said solution into a first crystallization zone,

spraying a highly volatile, pressurized and liquified cooling agent directly into said first crystallization zone into contact with said solution, wherein said cooling agent expands and cools said solution to a temperature sufficient to form a slurry of crystals of a first crystallizable component therein,

maintaining said temperature constant,

separating said crystals of first crystallizable component from said slurry to form a preliminary concentrated solution,

transferring substantially only said preliminary concentrated solution to at least one further crystallization zone separate from said first crystallization zone

spraying said cooling agent directly into said further crystal-

lization zone into contact with said preliminary concentrated solution in an amount sufficient

(a) to cool said preliminary solution in said further crystallization zone sufficiently below the temperature of said solution in said first crystallization zone to form a further slurry of crystals therein and at the same time

(b) to act as a liquefacient for said further slurry and thus reduce the viscosity thereof, the temperature of said preliminary concentrated solution in said further crystallization zone being such that the total of the crystals formed in said first and said further crystallization zones is about 65 to 100% of the crystallizable components of said solution,

separating said crystals from said further slurry to form a concentrated solution containing liquified coolant and

separating said cooling agent from said concentrated solution.

4,116,653

OPTICAL FIBER MANUFACTURE

John Irven, Bishops Stortford, England, assignor to International Standard Electric Corporation, New York, N.Y.

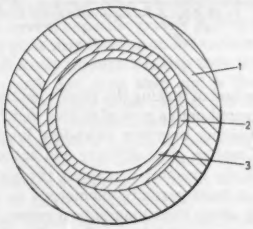
Continuation of Ser. No. 699,749, Jun. 24, 1976, abandoned.

Claims priority, Application United Kingdom, Jul. 4, 1975, 28396/75

This application May 9, 1977, Ser. No. 815,461

Int. Cl.[2] C03B *37/00*

U.S. Cl. 65—2 **6 Claims**



1. A method of making a glass optical fiber, comprising the steps of:

treating a hollow tube of high silica content borosilicate glass to promote phase separation into two continuous phases, the first phase consisting of a high softening point phase rich in silica and the second phase consisting of a lower softening point phase rich in sodium borate;

removing the second phase by leaching to provide a plurality of pores in said glass;

heat treating the remaining first phase of the glass to consolidate the first phase to form a self-supporting hollow tubular glass substrate;

depositing by a chemical vapor deposition reaction at least one layer of optical energy guiding glass upon the internal bore of the tubular substrate; and

collapsing and drawing said tubular substrate into an optical fiber.

4,116,654

LOW ATTENUATION, HIGH STRENGTH OPTICAL FIBER WITH SILICA FILAMENT CORE

Yves Michel Trehu, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 22, 1977, Ser. No. 770,462

Int. Cl.[2] G02B *1/10, 5/14*

U.S. Cl. 65—3 C **10 Claims**

1. In a process of forming an optical fiber comprising a silica filament core and a thermoplastic polymer cladding having an index of refraction lower than that of the core by

(a) drawing a silica filament core from a molten mass of silica, and

(b) melt coating a thermoplastic polymer having an index of refraction lower than that of the core onto the silica filament core,

the improvement comprising:

(i) in step (a), drawing the silica filament core at a temperature from 2040° C. to 2140° C. and

(ii) in step (b), melt coating the polymer by extrusion at a draw down ratio from 1.2 to 2.0 without the filament core having touched a solid surface.

4,116,655

METHOD FOR MAKING OPTICAL-FIBRE CABLES

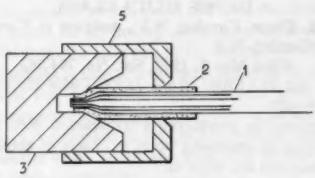
Edward Lloyd Lewis, Maidstone, England, assignor to Elliott Brothers (London) Limited, Chelmsford, England

Filed Jun. 30, 1976, Ser. No. 701,240

Claims priority, application United Kingdom, Jul. 9, 1975, 28879/75; Jul. 10, 1975, 29094/75; Oct. 31, 1975, 45220/75

Int. Cl.[2] C03B *23/20*

U.S. Cl. 65—4 B **9 Claims**



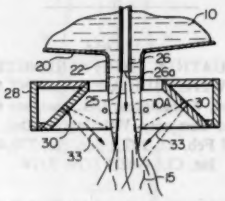
1. A method of terminating an optical fibre cable comprising a bundle of optical fibres, the method employing a die member and a deformable ferrule to enclose the fibre ends, the method including the steps of inserting the fibre ends into said deformable ferrule, heating said die member, and compressing said deformable ferrule onto said fibres by pushing the deformable ferrule axially into a tapered hole in said die member conductively to subject the fibre ends to heat from the die member and to deform them without any substantial fusion between individual ones of said fibres, so eliminating to a substantial extent any spaces between said fibre ends.

4,116,656

METHOD OF MANUFACTURING FIBERS OF INORGANIC MATERIAL AND APPARATUS FOR SAME

Kunihiko Mukai, c/o Mukai Consulting Engineers, Office, No. 349-45, Isshinden-cho, Tsu City, Japan; Michiharu Mishima, Matsusaka, Japan; Kiyoshi Ogino, Matsusaka, Japan, and Shuichi Iseki, Matsusaka, Japan, assignors to Central Glass Company, Limited, Ube and Kunihiko Mukai, Tsu, both of, Japan

Filed Jun. 14, 1977, Ser. No. 806,334
Claims priority, application Japan, Jun. 21, 1976, 51-72896
Int. Cl.[2] C03B *37/04*
U.S. Cl. 65—5 19 Claims



1. A method of manufacturing fibres of an inorganic material which is fiberizable from a molten state, the method comprising the steps of:

providing a vertically-extending straight and cross-sectionally circular first tube;

inserting a cross-sectionally circular second tube concentrically into said first tube such that a cross-sectionally annular space is defined in at least an uppermost portion of said first tube around said second tube;

allowing a melt of the inorganic material to fill up said annular space and vertically fall therethrough by gravitation thereby establishing a cross-sectionally annular stream within said annular space, said cross-sectionally annular stream forming a hollow cylindrical stream upon leaving said annular space;

continuously injecting generally downwards through said second tube a pressurized gas into said hollow cylindrical stream; and

continuously blowing a pressurized gas at said hollow cylindrical stream from the outside in a downwardly and inwardly inclined direction.

4,116,657

PROCESS FOR INCREASING THE ANNEALING POINT OF 96% SILICA GLASS

Thomas H. Elmer, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed May 5, 1977, Ser. No. 794,062
Int. Cl.[2] C03C *19/00, 15/00;* C03B *25/00*
U.S. Cl. 65—23 8 Claims

1. A process for producing a transparent 96% silica glass article having an annealing point in excess of about 1070° C. which comprises the steps of:

(a) depositing a carbon film upon the pore walls of a porous 96% silica glass article by contacting the porous glass at an elevated temperature with a hydrocarbon gas having a concentration sufficient to deposit said carbon film upon said pore walls but insufficient to clog the pores of said glass article;

(b) heating the glass article and carbon film under non-oxidizing conditions at a temperature below the porous glass consolidation temperature but not less than about 1000° C. for a time at least sufficient to achieve dehydroxylation of the porous glass; and

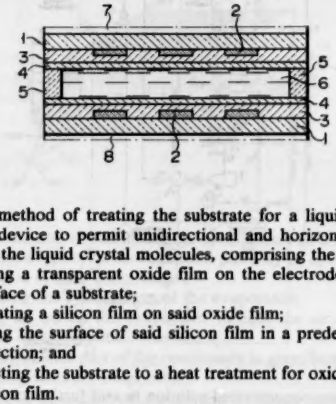
(c) heating the glass article in a dry oxidizing atmosphere at a temperature above the carbon oxidation temperature but below a porous glass consolidation temperature for a time at least sufficient to completely oxidize the carbon film.

4,116,658

METHOD OF COATING SUBSTRATE FOR LIQUID CRYSTAL DISPLAY DEVICE

Shunichi Sano, Zama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Dec. 21, 1977, Ser. No. 863,048
Claims priority, application Japan, Jan. 24, 1977, 52-5805
Int. Cl.[2] C03C *17/02, 17/30*
U.S. Cl. 65—42 7 Claims



1. A method of treating the substrate for a liquid crystal display device to permit unidirectional and horizontal alignment of the liquid crystal molecules, comprising the steps of

forming a transparent oxide film on the electrode bearing surface of a substrate;

laminating a silicon film on said oxide film;

rubbing the surface of said silicon film in a predetermined direction; and

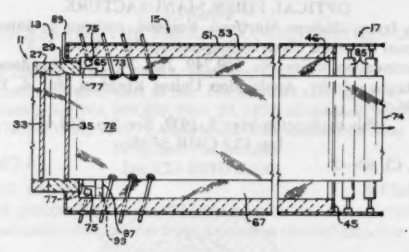
subjecting the substrate to a heat treatment for oxidizing the silicon film.

4,116,659

APPARATUS AND METHOD FOR CIRCULATING MOLTEN METAL IN A BATH USED IN THE MANUFACTURE OF GLASS

Joseph Michael Matesa, and Frank John Rau, both of Pittsburgh, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 31, 1977, Ser. No. 764,250
Int. Cl.[2] C03B *18/02*
U.S. Cl. 65—99 A 10 Claims



1. In a method of making flat glass wherein a layer of molten glass is delivered onto a pool of molten metal between a pair of spaced restraining members extending longitudinally from a location of molten glass delivery and spaced inwardly from side walls of the chamber containing the pool of molten metal and being at least partially submerged in the molten metal substantially along their longitudinal extent, the improvement which comprises establishing a flow of molten metal between the restraining members which is toward the location of molten glass delivery, causing the molten metal to flow outwardly under a submerged portion of each restraining member at locations adjacent to that of molten glass delivery and away from the location of molten glass delivery in portions of the pool of molten metal between the restraining members and the

side walls of the chamber by establishing a wave action in the portions of the pool of molten metal between the restraining members and the side walls of the chamber and thereafter dampening the waves in the flowing molten metal in the remainder of the pool of molten metal.

3. In an apparatus for making flat glass comprising an enclosed chamber containing a pool of glass-supporting molten metal and having a glass delivery end, chamber side walls and a pair of restraining members, each spaced from a side wall and spaced from each other, extending from the glass delivery end of the chamber, the improvement which comprises restraining members at least partially submerged in the pool of molten metal having openings through a lower portion of each of them in the vicinity of their ends adjacent the glass delivery end of the chamber and providing a subsurface communication between molten metal in a space between the restraining members and molten metal in the spaces between each restraining member and its closest chamber side wall,

means for causing waves in the molten metal in the spaces between the restraining members and the chamber side walls for establishing a flow of molten metal between the restraining members toward the glass delivery end of the chamber, through the openings in the restraining members and away from the glass delivery end of the chamber thereafter directing the flow of molten metal back into a main portion of the pool of molten metal, and

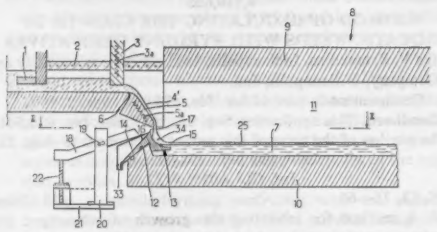
means, mounted adjacent the end of each restraining member remote from the glass delivery end of the chamber, for dampening the waves in the molten metal prior to directing the flow of molten metal back into the main portion of the pool of molten metal.

4,116,660

PRODUCTION OF FLAT GLASS

Michel Zortea, Chalon sur Saone, France, assignor to Saint-Gobain Industries, Neuilly-sur-Seine, France

Filed Jul. 19, 1977, Ser. No. 817,047
Claims priority, application France, Jul. 23, 1976, 76 22581
Int. Cl.[2] C03B *18/02*
U.S. Cl. 65—99 A **27 Claims**



1. In the method for the production of flat glass in which a molten glass vein is directed from a melting furnace onto a molten metal bath having a specific gravity greater than that of the glass to form a glass strip floating on the surface of the bath by causing it to fall freely through a falling zone from a height spaced above the bath and glass strip and is thereafter fed horizontally along the surface of the bath as it is being cooled and is finally removed at a predetermined exit velocity at the downstream end of the bath as a glass strip having a predetermined width and thickness, the improvement comprising:

(a) feeding the molten glass into the falling zone at a rate to form a bulb of molten glass along a deflecting surface located at the upper surface of the bath and through which the glass flows in passing from the freely falling state to the surface of the bath and to produce a horizontal component of movement in the glass as it passes through the bulb, which component extends in the same direction as the direction of movement of the glass strip on the surface of the bath.

11. In an apparatus for the production of flat glass in which a molten glass vein is poured from a melting furnace onto a molten metal bath having a specific gravity greater than that of the glass by causing it to fall freely from a height above the bath and is thereafter fed horizontally along the surface of the bath as it is being cooled and is finally removed at a predetermined exit velocity at the downstream end of the bath as a glass strip having a predetermined width and thickness, the improvement comprising:

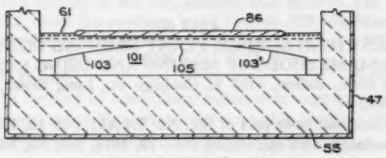
(a) a connecting member emerging out of said bath with the point of emergence being generally directly below the freely falling glass, said connecting member having an inclined forward surface facing in the direction of movement of the glass on the surface of the bath for receiving the freely falling glass at the level of the surface of the bath to give it a component of movement in the said direction.

4,116,661

SUBMERGED DAM BARRIERS FOR SELECTIVE DIVERSION OF MOLTEN METAL FLOW IN A GLASS FORMING CHAMBER

Charles K. Edge, Sarver, Pa., and Thomas J. Nier, Corpus Christi, Tex., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 7, 1977, Ser. No. 840,200
Int. Cl.[2] C03B *18/02*
U.S. Cl. 65—182 R **6 Claims**



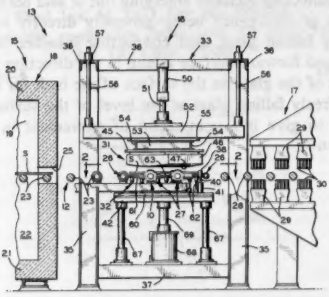
1. In a flat glass forming chamber including an enclosed chamber containing a pool of glass-supporting molten metal, means for delivering molten glass onto the pool of molten metal at an inlet end, means for removing a continuous sheet of glass from the pool of molten metal and from the chamber at an outlet end, means for advancing glass along the surface of the molten metal from the inlet end to the outlet end of the chamber while forming it into a continuous sheet of desired width and thickness and means for removing heat from the glass during its advance and for removing heat from the chamber, wherein there is provided in the pool of molten metal at least one dam barrier over which the glass can advance, the improvement which comprises

a dam barrier having an upper surface above the bottom of the pool of molten metal and extending at least partially transversely across a glass forming chamber beneath the surface of the pool of molten metal, which dam barrier has a central portion of its upper surface spaced closer to the surface of the pool of molten metal in a central portion of the glass forming chamber than the upper surface of the marginal portion of the dam barrier in a marginal portion of the glass forming chamber for permitting a greater flow of molten metal over the dam barrier along the marginal portion than along the central portion of the glass forming chamber.

4,116,662
GLASS SHEET SUPPORTING AND CONVEYING APPARATUS

Robert G. Revells, Toledo, Ohio, assignor to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Sep. 22, 1977, Ser. No. 835,720
Int. Cl.[2] C03B 23/02
U.S. Cl. 65—289 15 Claims



1. A conveyor roll comprising: a pair of elongated sections, each section formed of an inner core and an outer rotatable load supporting sleeve mounted on said core for rotation thereabout, said cores including outer ends having a common axis and inner ends axially offset from each other, means interposed between said core inner ends for connecting said inner ends together to form a unitary one piece construction of irregular angular shape, said sleeves having inner ends terminating inwardly of said core inner ends for free rotation about said cores, respectively, and drive means connected to the outer ends of said sleeves for rotating said sleeves in unison.

4,116,663
PLANT IRON SOURCE, PLANT GROWING MEDIUM, AND METHODS OF MAKING AND USING SAME

John McK. Ballou, 3105 E. Coolidge St., Long Beach, Calif. 90805

Continuation-in-part of Ser. No. 596,421, Jul. 16, 1975, abandoned. This application Nov. 19, 1976, Ser. No. 743,304
Int. Cl.[2] C05F 11/00
U.S. Cl. 71—23 26 Claims

19. A growing medium for plants comprising the combination of Fe, and vegetable tannin reacted by the presence of H_2O and in the presence of an alkaline material to provide a plant growth stimulant and iron source.

4,116,664
FERTILIZER COMPOSITION AND METHOD OF MAKING SAME

Leon R. Jones, P.O. Box 597, Chandler, Ariz. 85224

Continuation-in-part of Ser. No. 738,888, Nov. 4, 1976, abandoned, which is a continuation-in-part of Ser. No. 670,240, Mar. 25, 1976, abandoned. This application Jun. 6, 1977, Ser. No. 803,435
Int. Cl.[2] C05B 15/00
U.S. Cl. 71—29 30 Claims

1. A method for making a liquid nitrogen sulfur fertilizer composition comprising the steps of:

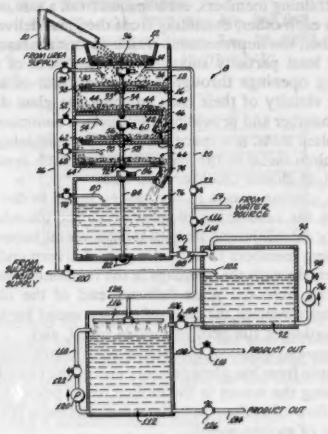
(a) adding a small quantity of a total predetermined amount of sulfuric acid to a total predetermined amount of urea to cause a reaction therebetween with said quantity of sulfuric acid being sufficient to produce a reaction temperature in the range of from approximately 100° F. to 225° F.;

(b) blending said quantity of sulfuric acid with said urea during step a to initiate the formation of a reacting molten slurry thereof;

(c) adding an additional small quantity of said total amount of sulfuric acid to said reacting molten slurry with said additional quantity of sulfuric acid being sufficient to maintain said reaction temperature in the range of from approximately 100° F. to 225° F.;

(d) blending said additionally added sulfuric acid with said reacting molten slurry during step c; and

(e) repeating steps c and d sequentially until the total amount



of sulfuric acid has been added which achieves a gradual reaction of said sulfuric acid with said urea to form a homogenous fused solution of urea sulfate and urea.

18. A new composition of matter useful as a one treatment liquid fertilizer consisting of

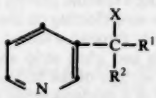
a solution of urea sulfate and urea produced by the process of claim 1.

4,116,665
METHOD OF REGULATING THE GROWTH OF AQUATIC WEEDS WITH PYRIDINE DERIVATIVES

Eriks V. Krumkalns, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 673,030, Apr. 2, 1976, abandoned. This application Sep. 15, 1977, Ser. No. 833,541
The portion of the term of this patent subsequent to Aug. 23, 1994, has been disclaimed.
Int. Cl.[2] A01N 9/22
U.S. Cl. 71—66 13 Claims

1. A method for inhibiting the growth of submerged and floating aquatic weeds which comprises adding to the water containing said weeds an amount sufficient to provide a growth-regulating and non-herbicidal concentration of a compound of the formula



wherein

X is hydrogen, hydroxyl, halo, C_1-C_3 alkoxy, C_1-C_6 alkylthio, cyclohexylthio, 4-chlorophenylthio, $-N(R^3)_2$, acetamido, imidazol-1-yl, morpholino, or cyano;

R^1 is hydrogen, C_1-C_9 alkyl, ethynyl, C_3-C_6 cycloalkyl, benzyl, phenyl, or monohalophenyl;

R^2 is C_1-C_9 alkyl, C_3-C_6 cycloalkyl, cyclohexylmethyl, cyclohexylethyl, phenyl, monohalophenyl, dihalophenyl, 3,4-(methylenedioxy)phenyl, trifluoromethylphenyl, p-cumenyl, tolyl, phenoxyphenyl, phenoxy(C_1-C_4)alkyl, benzyl, C_1-C_4 alkoxyphenyl, pentafluorophenyl, xylyl,

2-thienyl, 3-pyridyl, 1,3-dioxan-5-yl, or 5-methyl-1,3-dioxan-5-yl; and

R^1 and R^2, when taken together with the carbon atom to which they are attached, form 2,6-dimethylcyclohexan-1-yl, 9-fluorenyl, 10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl, 9-xanthenyl, 5H-dibenzo[a,d]cycloheptenten-5-yl, or 9-thioxanthenyl;

R^3 is hydrogen or C_1-C_6 alkyl; and

the nonphytotoxic acid addition salts thereof.

4,116,666
METHOD OF TREATING SEED

John Wesley Willard, Sr., Rapid City, S. Dak., assignor to CAW Industries, Inc., Rapid City, S. Dak.

Continuation-in-part of Ser. No. 593,712, Jul. 7, 1975, Pat. No. 4,084,938, which is a continuation-in-part of Ser. No. 317,097, Dec. 20, 1972, Pat. No. 3,893,943, which is a continuation of Ser. No. 108,198, Jan. 20, 1971, abandoned. This application Nov. 8, 1976, Ser. No. 740,041

Int. Cl.² A01N *21/02*

U.S. Cl. 71—77 **22 Claims**

1. A method of propagating plants from seed comprising intimately contacting the seed with water containing a catalytically effective amount of a catalyst to achieve faster germination thereof, and thereafter germinating the seed and propagating plants therefrom, the said catalyst being prepared by a process comprising

admixing a water soluble alkali metal silicate with an aqueous medium containing a dissolved substance which is a source of calcium ion and a dissolved substance which is a source of magnesium ion,

the aqueous medium being in liquid phase and containing said dissolved substances in amounts to provide between about 1×10^{-4} and 1×10^{-1} mole per liter each of calcium ion and magnesium ion,

the aqueous medium containing said dissolved substances in amounts to provide a molar ratio of calcium ion to magnesium ion between about 2.0:1.0 and 1.0;2.0,

the alkali metal silicate having an alkali metal oxide to silicon dioxide ratio between about 0.9:1.0 and less than 2.0:1.0 and being admixed with the aqueous medium in an amount of about 0.05–2 moles per liter,

the said alkali metal silicate reacting in the liquid phase aqueous medium with said dissolved substances providing calcium ion and magnesium ion and in the said molar ratio of calcium ion to magnesium ion to thereby produce an aqueous suspension of finely divided particles of the reaction product,

admixing a micelle-forming surfactant with the aqueous medium in an amount to form catalyst micelles comprising said finely divided particles upon agitating the aqueous medium, and

agitating the aqueous medium containing the finely divided particles and surfactant to form said catalyst micelles,

the said alkali metal silicate, the said dissolved substances which are sources of calcium ion and magnesium ion, and the said surfactant producing a catalyst in the said process for preparing the catalyst which is effective in the said method of propagating plants to initially cause the said seed to germinate faster and to thereafter promote the propagation of plants therefrom.

4,116,667
N-BENZYL-2,6-DINITRO-3-AMINO-4-TRIFLUOROMETHYLANILINES AS PLANT GROWTH REGULANTS

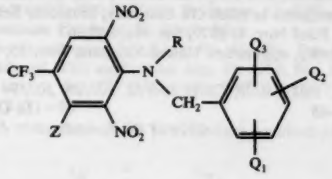
Merrill Wilcox, 2911 NW. 30th Ter., Gainesville, Fla. 32601

Division of Ser. No. 533,045, Dec. 16, 1974, Pat. No. 4,046,809. This application Jun. 22, 1977, Ser. No. 808,761

Int. Cl.² A01N *9/20*

U.S. Cl. 71—78 **6 Claims**

1. A composition for regulating the growth of plants by means of retardation which comprises (1) as active ingredient a compound of the formula



in which

R is lower alkyl,

Z is amino, lower alkylamino or di lower alkylamino,

each of Q_1 and Q_2 is hydrogen, halogen, lower alkyl or methoxy, and

Q_3 is hydrogen, lower alkyl or methoxy, and (2) a carrier.

4,116,668
N-CARBAMOYL ETHYL OXANILATES

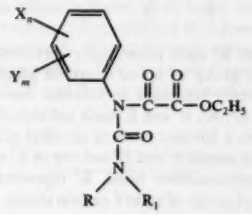
Edmund J. Gaughan, Berkeley, and George B. Large, Orinda, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 759,206, Jan. 13, 1977, Pat. No. 4,068,097, which is a division of Ser. No. 638,491, Dec. 8, 1975, Pat. No. 4,018,813, which is a continuation of Ser. No. 559,104, Mar. 17, 1975, abandoned. This application Oct. 3, 1977, Ser. No. 839,131

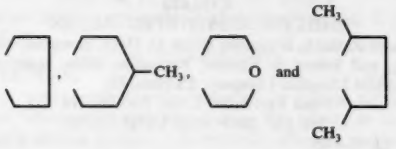
Int. Cl.² A01N *9/20, 9/22, 9/28*

U.S. Cl. 71—88 **17 Claims**

1. The method of controlling undesirable vegetation comprising applying to the locus where control is desired a phytotoxic amount of a compound having the formula



wherein X and Y are independently selected from the group consisting of chloro, bromo and trifluoromethyl; *n* is either 0 or 1; *m* is either 0 or 1; and R and R_1 are independently selected from the group consisting of lower alkyl from C_1 to C_3, inclusive; and lower alkoxy from C_1 to C_3, inclusive, or R and R_1 taken together is selected from the group consisting of



4,116,669

HERBICIDAL TETRAHYDROFURAN DERIVATIVES

Michael D. Barker, and Eirlys R. Barker, both of Maidstone, England, assignors to Shell Oil Company, Houston, Tex.

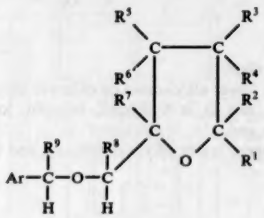
Filed Nov. 8, 1977, Ser. No. 849,567

Claims priority, application United Kingdom, Nov. 10, 1976, 46771/76

Int. Cl.[2] A01N *9/28;* **C07D** *307/12, 307/28, 307/94*

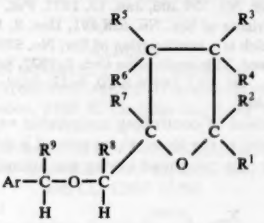
U.S. Cl. 71—88 **14 Claims**

1. A tetrahydrofuran derivative of the formula



wherein R^1 and R^2 each individually represents a hydrogen atom, a methyl group, or R^1 and R^2 together represent a pentamethylene moiety; R^3, R^4, R^5, and R^6 each individually represents a hydrogen atom or one of R^3 and R^4 and one of R^5 and R^6 together represent a carbon-carbon bond; R^7 represents an ethyl group; R^8 and R^9 each individually represents a hydrogen atom; and Ar represents a phenyl group or a phenyl group substituted with a 2-methyl-, 2-fluoro- or a 2,6-dichloro group.

11. A method of eradicating or controlling weeds infesting cereal crops at a locus by applying a herbicidally active amount of a tetrahydrofuran derivative of the formula



wherein R^1 and R^2 each individually represents a hydrogen atom, an alkyl group of up to 6 carbon atoms or a phenyl group; or together represent an alkylene moiety of up to 6 carbon atoms; R^3, R^4, R^5 and R^6 each individually represents a hydrogen atom, a halogen atom or an alkyl group of up to 6 carbon atoms or one of R^3 and R^4 and one of R^5 and R^6 together represent a carbon-carbon bond; R^7 represents a hydrogen atom or an alkyl group of up to 6 carbon atoms; R^8 and R^9 each individually represents a hydrogen atom or an alkyl group of up to 6 carbon atoms; and Ar represents a phenyl group or a phenyl group substituted by one or more halogen atoms or alkyl or alkoxy groups of up to 6 carbon atoms.

4,116,670

DIOXANE SUBSTITUTED AMIDES

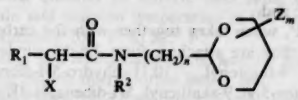
Leonard J. Stach, Riverside; Roger D. Hotz, Evanston, both of Ill., and Sidney B. Richter, Barberton, Ohio, assignors to Velsicol Chemical Company, Chicago, Ill.

Filed Apr. 4, 1977, Ser. No. 784,214

Int. Cl.[2] A01N *9/00;* **C07D** *319/04*

U.S. Cl. 71—88 **9 Claims**

1. A compound of the formula



wherein R^1 is selected from the group consisting of hydrogen and alkyl; X is halogen; R^2 is selected from the group consisting of alkyl, alkenyl and alkynyl; n is the integer 1 or 2; Z is alkyl; and m is an integer from 0 to 4.

8. A herbicidal composition comprising an inert carrier and, as an essential active ingredient, a herbicidally effective amount of a compound of claim 1.

9. A method of controlling weeds which comprises contacting said weeds with an effective amount of a herbicidal composition of claim 8.

4,116,671

3-ISOXAZOLYLCARBAMATE DERIVATIVES

Hisajiro Yukinaga, Kusatsu; Shinzaburo Sumimoto, Osaka; Ichiro Ishizuka, Higashinose, and Jitsuo Sugita, Ikeda, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Division of Ser. No. 667,033, Mar. 15, 1976, Pat. No. 4,062,861, which is a continuation of Ser. No. 491,491, Jul. 23, 1974, abandoned. This application Sep. 23, 1977, Ser. No. 836,237

Claims priority, application Japan, Jul. 27, 1973, 48-85339

Int. Cl.[2] A01N *9/28;* **C07D** *261/14*

U.S. Cl. 71—88 **21 Claims**

1. A compound selected from the group consisting of methyl N-(5-propyl-3-isoxazolyl)carbamate, methyl N-(5-i-propyl-3-isoxazolyl)carbamate, methyl N-(5-t-butyl-3-isoxazolyl)carbamate, i-propyl N-(5-i-propyl-3-isoxazolyl)carbamate, i-propyl N-(5-t-butyl-3-isoxazolyl)carbamate, methyl N-(5-i-butyl-3-isoxazolyl)carbamate, ethyl N-(5-t-butyl-3-isoxazolyl)carbamate, methyl N-methyl-N-(5-t-butyl-3-isoxazolyl)carbamate, 2-propynyl N-(5-t-butyl-3-isoxazolyl)carbamate, methyl N-(5-t-butyl-3-isoxazolyl)thiolcarbamate, phenyl N-(5-t-butyl-3-isoxazolyl)thiolcarbamate, 2,2,2-trichloroethyl N-(5-t-butyl-3-isoxazolyl)carbamate, allyl N-(5-t-butyl-3-isoxazolyl)carbamate, propyl N-(5-t-butyl-3-isoxazolyl)carbamate, 2-hydroxyethyl N-(5-t-butyl-3-isoxazolyl)carbamate, 2-methoxyethyl N-(5-t-butyl-3-isoxazolyl)carbamate, α,α-dimethylbenzyl N-(5-t-butyl-3-isoxazolyl)carbamate, 2,2,2-trifluoroethyl N-(5-t-butyl-3-isoxazolyl)carbamate and methyl N-(4-bromo-5-t-butyl-3-isoxazolyl)carbamate.

21. A herbicidal composition comprising a herbicidal amount of a compound selected from the group consisting of methyl N-(5-propyl-3-isoxazolyl)carbamate, methyl N-(5-i-propyl-3-isoxazolyl)carbamate, methyl N-(5-t-butyl-3-isoxazolyl)carbamate, i-propyl N-(5-i-propyl-3-isoxazolyl)carbamate, i-propyl N-(5-t-butyl-3-isoxazolyl)carbamate, methyl N-(5-i-butyl-3-isoxazolyl)carbamate, ethyl N-(5-t-butyl-3-isoxazolyl)carbamate, methyl N-methyl-N-(5-t-butyl-3-isoxazolyl)-carbamate, 2-propynyl N-(5-t-butyl-3-isoxazolyl)carbamate, methyl N-(5-t-butyl-3-isoxazolyl)thiolcarbamate, phenyl N-(5-t-butyl-3-isoxazolyl)thiolcarbamate, 2,2,2-trichloroethyl N-(5-t-butyl-3-isoxazolyl)carbamate, allyl N-(5-t-butyl-3-isoxazolyl)carbamate, propyl N-(5-t-butyl-3-isoxazolyl)carbamate, 2-hydroxyethyl N-(5-t-butyl-3-isoxazolyl)carbamate, 2-methoxyethyl N-(5-t-butyl-3-isoxazolyl)carbamate, α,α-dimethylbenzyl N-(5-t-butyl-3-isoxazolyl)carbamate, 2,2,2-trifluoroethyl N-(5-t-butyl-3-isoxazolyl)carbamate and methyl N-(4-bromo-5-t-butyl-3-isoxazolyl)carbamate, in combination with a carrier therefor.

4,116,672

4(3H)-OXOBENZO-2,1,3-THIADIAZINE-2,2-DIOXIDES AND DERIVATIVES THEREOF

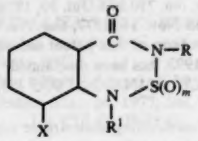
Lennon H. McKendry, Midland, Mich., and Walter P. Bland, Silver Spring, Md., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 660,577, Mar. 12, 1976, Pat. No. 4,051,130, which is a continuation-in-part of Ser. No. 497,583, Aug. 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 398,355, Sep. 17, 1973, abandoned. This application Jun. 20, 1977, Ser. No. 807,996

Int. Cl.[2] A01N *9/14*

U.S. Cl. 71—91 79 Claims

1. A herbicidal composition comprising a herbicidal amount of a compound corresponding to the formula:



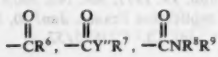
wherein:

X represents $-CH_3$, $-OCH_3$ or CF_3;

m represents an integer of 1 or 2;

R represents loweralkyl of 1 to about 6 carbon atoms, haloloweralkyl of 1 to about 6 carbon atoms, alkenyl of 3 to about 6 carbon atoms, haloalkenyl of 3 to about 6 carbon atoms, alkynyl of 3 to about 6 carbon atoms, haloalkynyl of 3 to about 6 carbon atoms, cycloalkyl of 3 to about 8 carbon atoms, unsubstituted phenyl, loweralkylphenyl, halophenyl, benzyl, loweralkylbenzyl, halobenzyl, loweralkoxyloweralkyl of 2 to 6 carbon atoms, diloweralkylaminoloweralkyl of 3 to 10 carbon atoms; loweralkylthioloweralkyl of 2 to 6 carbon atoms, or cyanoloweralkyl of 2 to 7 carbon atoms;

R^1 represents hydrogen,



$-SO_2R^{10}$ or $-SO_2NR^8R^9$;

R^6 represents loweralkyl and haloloweralkyl having from 1 to 5 carbon atoms, alkenyl and haloalkenyl of 2 to 5 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, loweralkoxyloweralkyl, loweralkylthioloweralkyl, each of 2 to 6 carbon atoms, alkoxycarbonylalkyl of 4 to 8 carbon atoms, phenyl, loweralkylphenyl or halophenyl;

R^7 represents alkyl of 1 to 7 carbon atoms, haloalkyl of 1 to 4 carbon atoms, alkenyl and haloalkenyl of 3 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, phenyl, loWeralkylphenyl or halophenyl;

R^8 represents loweralkyl of 1 to 4 carbon atoms and cycloalkyl of 3 to 6 carbon atoms;

R^9 represents R^8 and alkoxy, and when taken together with R^8 and the nitrogen from which each depends, a heterocyclic ring of 4 to 8 carbon atoms;

R^{10} represents alkyl and haloalkyl, each of 1 to 7 carbon atoms; and

where R^1 is hydrogen, the salts thereof with organic or inorganic bases,

in admixture with a solid or liquid adjuvant.

4,116,673

1-ALKYL-3-ARYL-4-PYRAZOLECARBOXYLATES

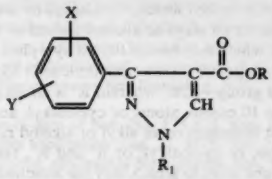
Lawrence H. Brannigan, Creve Coeur; John E. Franz, Crestwood, and Robert K. Howe, Bridgeton, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 645,181, Dec. 29, 1975, abandoned. This application Aug. 18, 1976, Ser. No. 715,011

Int. Cl.[2] A01N *9/22*; C07D *231/14*

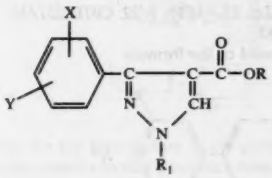
U.S. Cl. 71—92 15 Claims

1. A compound of the formula



wherein R is selected from the group consisting of hydrogen and its agriculturally acceptable cations, alkyl having from 1 to 8 carbon atoms, phenoxy lower alkyl, lower alkyl thio lower alkyl and tetrafluorocyclobutylmethyl; R_1 is lower alkyl; and X and Y are independently selected from the group consisting of hydrogen, trifluoromethyl, halo, lower alkyl and lower alkoxy; provided that X, Y and R may not simultaneously be hydrogen.

9. A herbicidal composition comprising a herbicidal adjuvant and a herbicidally effective amount of a compound having the formula



wherein R is selected from the group consisting of hydrogen and its agriculturally acceptable cations, alkyl having from 1 to 8 carbon atoms, phenoxy lower alkyl, lower alkyl thio lower alkyl and tetrafluorocyclobutylmethyl; R_1 is lower alkyl; and X and Y are independently selected from the group consisting of hydrogen, trifluoromethyl, halo, lower alkyl and lower alkoxy; provided that X, Y and R may not simultaneously by hydrogen.

4,116,674

PROCESS OF SEVERELY DAMAGING OR KILLING UNWANTED PLANTS WITH PYRIMIDINE COMPOUNDS

Raymond Leo Sunley, and Geoffrey David Snowling, both of Woodley, England, assignors to Imperial Chemical Industries Limited, London, England

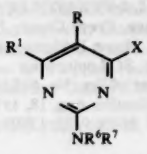
Filed Jul. 21, 1975, Ser. No. 597,572

Claims priority, application United Kingdom, Aug. 5, 1974, 34335/74

Int. Cl.[2] A01N *9/22*

U.S. Cl. 71—92 6 Claims

1. A process of severely damaging or killing unwanted plants, which comprises applying to the plants, or to the growth medium thereof, a herbicidally effective amount of pyrimidine compound of the formula:-



or a herbicidal acid addition salt thereof, wherein R^1 is an alkyl radical of 1 to 6 carbon atoms, cycloalkyl or alkenyl; R is a hydrogen atom or an alkyl or alkenyl radical of from 1 to 12 carbon atoms, which may be substituted by a phenyl radical; or R^1 and R taken together form a trimethylene or tetramethylene radical; X is a group —OR^5 wherein R^5 is an alkyl or alkenyl radical of 1 to 10 carbon atoms or cycloalkyl; and R^6 and R^7 each represent hydrogen or an alkyl or alkenyl radical of 1 to 8 carbon atoms, or cycloalkyl, or R^6 and R^7, taken together with the nitrogen atom to which they are attached constitute a pyrrolidinyl, piperidinyl, or morpholinyl ring.

4,116,675

PYRIDINIUM-S-TRIAZINES FOR REGULATING PLANT GROWTH

Hanspeter Fischer, Bottmingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

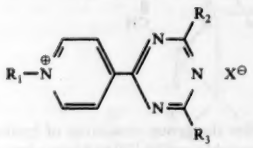
Filed Apr. 27, 1977, Ser. No. 791,267

Claims priority, application Switzerland, May 4, 1976, 5553/76

Int. Cl.[2] A01N *9/22;* **C07D** *251/16*

U.S. Cl. 71—93 **13 Claims**

1. A compound of the formula



in which R_1 represents an alkyl group of from 1 to 12 carbon atoms or a C_1–C_4 alkyl group substituted by halogen, C_1–C_4 alkoxy, cyano, phenyl, carboxyl, C_1–C_4 alkoxycarbonyl, C_1–C_4 alkylcarbonyl, aminocarbonyl, mono- and di-(C_1–C_4) alkylaminocarbonyl, or R_1 represents C_3–C_7 alkenyl or C_3–C_7 haloalkenyl, each of R_2 and R_3 independently represents hydrogen, alkyl from 1 to 4 carbon atoms, haloalkyl from 1 to 4 carbon atoms; and $X^{\ominus}$ is a halogen anion, $Br_e^{\ominus}$ or $CH_3OSO_2O^{\ominus}$.

4,116,676

4-METHYLTHIO-2-TRIFLUOROMETHYLMETHANE-SULFONANILIDE AND DERIVATIVES THEREOF

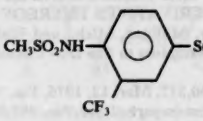
Tomas L. Fridinger, Woodbury; George G. I. Moore, Birchwood, and Larry R. Lappi, Stillwater, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 523,673, Nov. 14, 1974, Pat. No. 3,996,277. This application Nov. 5, 1976, Ser. No. 739,133

Int. Cl.[2] A01N *9/16*

U.S. Cl. 71—103 **7 Claims**

1. A method for supressing or inhibiting the growth of higher plants which comprises contacting said plants with an effective amount of a compound of the formula



wherein *n* is zero, one or two and agriculturally acceptable salts thereof.

4,116,677

N-ALKYL-ALPHA-(SUBSTITUTED PHENOXY) ALKYLAMIDES AND THEIR USE AS HERBICIDES

Francis H. Walker, Mill Valley, and Don R. Baker, Orinda, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

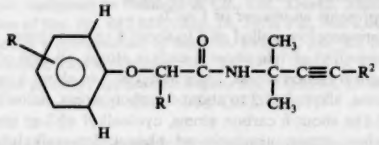
Continuation of Ser. No. 710,051, Jul. 30, 1976, abandoned. This application Nov. 14, 1977, Ser. No. 850,998

The portion of the term of this patent subsequent to Jul. 27, 1993, has been disclaimed.

Int. Cl.[2] A01N *9/20;* **C07C** *103/22*

U.S. Cl. 71—118 **15 Claims**

11. A method of controlling undesirable vegetation comprising applying to the locus where control is desired an herbicidally effective amount of a compound having the formula



in which R is 3,5-dimethyl or 3,5-dichloro; R^1 is methyl or ethyl; and R^2 is methyl or ethyl.

4,116,678

METHOD OF PRODUCING IRON

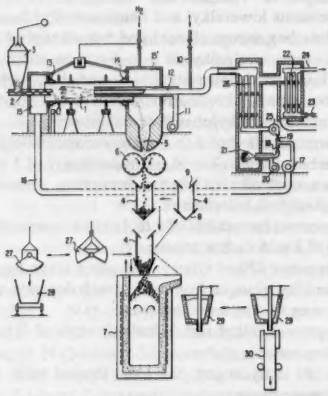
Robert Lafont, Gif sur Yvette, and Louis H. Hallot, Gagny, both of France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt, France

Filed Jan. 19, 1977, Ser. No. 760,819

Claims priority, application France, Jan. 20, 1976, 76 01333

Int. Cl.[2] C21C *5/52*

U.S. Cl. 75—11 **5 Claims**



1. A method of producing iron by direct reduction of ore,

compaction into agglomerates and fusion of the reduced ore comprising the steps of:

reducing said ore by a gaseous process in two stages, first a prereduction to iron monoxide FeO in a 950°–1100° C. reducing atmosphere in a first reduction zone, then, without transition, reducing said iron monoxide at a temperature between 650°–750° C. in powdered form in a second reduction zone;

immediately compacting the resultant powder to agglomerates at the output temperature of a reducing kiln and collecting such agglomerates in a continuous manner which limits their cooling;

melting said agglomerates by mixing and contacting the same with a pre-existing charge of liquid metal in an induction furnace, to complete fusion; and

skimming the slag of said fusion and then pouring a resulting liquid metal charge into a ladle, to be refined, treated and poured, and then fed into a continuous casting installation.

4,116,679

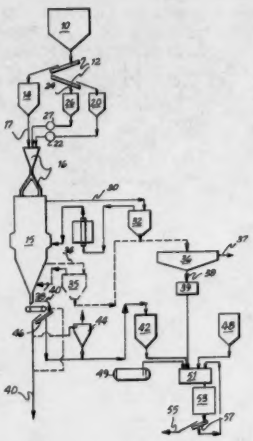
METALLIZED IRON BRIQUET

Wolfgang B. Pietsch, Charlotte, N.C., assignor to Midrex Corporation, Charlotte, N.C.

Division of Ser. No. 682,418, May 3, 1976, Pat. No. 4,032,352. This application Mar. 24, 1977, Ser. No. 780,960

Int. Cl.[2] C21B *13/00*

U.S. Cl. 75—34 **6 Claims**



1. A method of making a briquet from directly reduced finely divided metallized material, comprising:

mixing from 85 to 95 percent finely divided metallized material with from 5 to 15 percent of binder comprising:

about 2 to about 40 percent pitch,

about 15 to about 35 percent hydrated lime,

about 15 to about 30 percent of a solution of sodium silicate, and up to 50 percent water;

to form a free flowing yet dense briquet feed material;

densifying said feed material, and

forming said feed material into briquets.

4,116,680

COPRODUCTION OF IRON AND CARBON BLACK

Robert Kenneth Jordan, 3979 Tuxey Ave., Pittsburgh, Pa. 15227

Filed Feb. 24, 1976, Ser. No. 660,934

Int. Cl.[2] C21B *5/00*

U.S. Cl. 75—41 **2 Claims**

1. A process for the simultaneous production of a ferrous metal and carbon black comprising,

a. operating a ferrous metal blast furnace, modified by obviating the stoves and equipped to recycle a part of the top gas to the combustion zone, with a carbonaceous fuel combusted with oxygen in the presence of recycled gas of at least one of carbon monoxide and carbon dioxide to produce a molten ferrous metal and a top gas of carbon monoxide and carbon dioxide,

b. disproportionating the contained carbon monoxide of the cleaned remaining top gas to carbon black and carbon dioxide.

4,116,681

PROCESS FOR THE MANUFACTURE OF ORE PELLETS

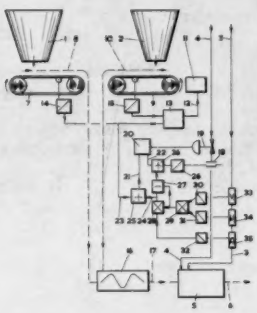
Herman Radstake, Uitgeest; Nicolas A. Hasenack, Heemskerk; Anthonie Van Latenstein, Santpoort, and Jacobus J. Burger, Driehuis, all of Netherlands, assignors to Koninklijke Nederlandsche Hoogovens en Staalfabrieken, N.V., Ijmuiden, Netherlands

Continuation-in-part of Ser. No. 179,670, Sep. 13, 1971, abandoned. this application Aug. 27, 1975, Ser. No. 608,333

Claims priority, application Netherlands, Sep. 11, 1970, 13457

Int. Cl.[2] C21B *5/00*

U.S. Cl. 75—41 **5 Claims**



1. A process for the manufacture of ore pellets comprising mixing a fine ore powder having a moisture content of less than 0.1% and consisting essentially of particles having a size less than 90 μ with 0.05 to 1% by volume of a powdered adhesive, adding 8 to 9% of water by weight to said mixture while said mixture is at a temperature of 50° to 90° C, homogenizing the mixture by a ploughing action to produce a moist mixture consisting essentially of fine ore powder, less than 1% of adhesive and about 8% of water, forming pellets from said moist mixture by a rolling operation and thereafter baking said formed pellets to produce the desired pellets.

5. Baked ore pellets prepared in accordance with the process of claim 1.

4,116,682

AMORPHOUS METAL ALLOYS AND PRODUCTS THEREOF

Donald E. Polk, 2 Rollins Pl., Boston, Mass. 02114, and Bill C. Giessen, 22 Centre St., Cambridge, Mass. 02139

Filed Dec. 27, 1976, Ser. No. 754,537

Int. Cl.[2] C22C *19/02, 19/07, 22/00, 27/06, 37/00, 38/00*

U.S. Cl. 75—123 H **8 Claims**

1. An amorphous metal alloy of the formula $M_aT_bX_c$ which is substantially amorphous when rapidly cooled to the solid state wherein M is at least one element selected from the group consisting of Fe, Co, Ni, Cr and Mn and mixtures thereof, T is at least one element selected from the group consisting of Zr, Ta, Nb, Mo, W, Y, Ti and V and mixtures thereof, and X is at least one element selected from the group consisting of B, Si, P, C, Ge and As and mixtures thereof, wherein *a*, *b* and *c* are atomic percentages ranging from about 60 to 87, 3 to 30, and 1 to 10, respectively, said *a*, *b* and *c* totalling 100 in any one alloy.

4,116,683

NICKEL-FREE AUSTENITIC CORROSION-RESISTANT STEEL

Ivan Dimov Nikolov; Tzolo Valkov Rashev; Rangel Petrov Ivanov, and Chavdar Andreev Andreev, all of Sofia, Bulgaria, assignors to Institute po Metaloznanie i Technologia na Metalite, Sofia, Bulgaria

Continuation-in-part of Ser. No. 672,339, Mar. 31, 1976, abandoned, which is a continuation of Ser. No. 459,191, Apr. 8, 1974, abandoned. This application Apr. 25, 1977, Ser. No. 790,537

Claims priority, application Bulgaria, Apr. 11, 1973, 23260

Int. Cl.[2] C22C *38/20, 38/38*

U.S. Cl. 75—125 **4 Claims**

1. A nickel-free corrosion-resistant steel which consists by weight of:

0.035% ≦ carbon ≦ 0.08%
18.05% ≦ chromium ≦ 21.0%
8.0% ≦ manganese ≦ 9.0%
0.50% ≦ nitrogen ≦ 0.90%
silicon ≦ 0.9%
sulfur ≦ 0.025%
phosphorus ≦ 0.035%
copper ≦ 3%
and the remainder being iron.

4,116,684

HIGH SPEED TOOL STEEL HAVING HIGH TOUGHNESS

Norimasa Uchida, Matsue; Kingo Kiyonaga, Yonago, and Hideki Nakamura, Yasugi, all of Japan, assignors to Hitachi Metals, Ltd., Japan

Filed Mar. 11, 1977, Ser. No. 776,924

Claims priority, application Japan, Mar. 17, 1976, 51-28090

Int. Cl.[2] C22C *38/22, 38/24, 38/26, 38/28*

U.S. Cl. 75—126 C **5 Claims**

1. A high speed tool steel having high toughness, consisting essentially of by weight percentages, C 0.7 – 1.4%; Si 0.5% max.; Mn 0.5% max.; Cr 3 – 6%; W 1 – 3.2%, Mo 5.5 – 7.5%, and the relationship between the contents of W and Mo being 12% ≦ W + 2Mo ≦ 16%; V 1 – 3.5%; Co 15% max.; N 0.02 – 0.1%; one or more of the elements selected from the group of Ti, Nb and Zr and being 0.02 – 0.1% in total, the balance being Fe and incidental impurities.

4,116,685

TOOL STEEL FOR WARM AND HOT WORKING

Toshio Okuno, Yasugi, Japan, assignor to Hitachi Metals, Ltd., Japan

Continuation-in-part of Ser. No. 642,718, Dec. 22, 1975, abandoned. This application Apr. 22, 1977, Ser. No. 789,993

Claims priority, application Japan, Dec. 27, 1974, 49-148981

Int. Cl.[2] C22C *38/44, 38/46, 38/52*

U.S. Cl. 75—128 B **4 Claims**

1. Tool steel for warm and hot working which consists essentially of, by weight, 0.50 – 1.0% of C, up to 1.50% of Si, up to 1.50% of Mn, 0.7 – 1.5% of Ni, 3.0 – 4.5% of Cr, 1.3 – 5.0% of W, 4.2 – 9.0% of Mo, 1.30 – 3.0% of V, 0.9 – 6.0% of Co and the balance essentially Fe and impurities, contents of said C and V satisfying $0.15 + 0.2\,V \leqq C \leqq 0.42 + 0.2\,V$.

4,116,686

COPPER BASE ALLOYS POSSESSING IMPROVED PROCESSABILITY

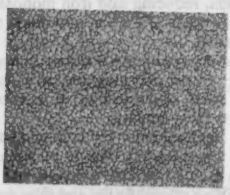
Brian Mravic, North Haven; Stanley Shapiro, New Haven; Derek E. Tyler, Cheshire, and Abid Khan, Hamden, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 686,173, May 13, 1976, abandoned. This application Aug. 25, 1977, Ser. No. 827,495

Int. Cl.[2] C22C *9/02*; C22D *1/08*

U.S. Cl. 75—154 **9 Claims**

5. A copper base alloy in the cast condition, said cast alloy having a substantially non-dendritic grain structure and improved resistance to crack propagation during hot working, said alloy consisting essentially of from about 4.0 to about 6.0% tin, from about 0.01 to about 0.03% phosphorus, from about 1.9 to about 2.5% iron, from about 0.1 to about 0.3%



chromium, balance essentially copper, wherein said alloy is characterized when placed in the wrought condition by the substantial absence of phosphorus-rich and tin-rich low melting phases.

4,116,687

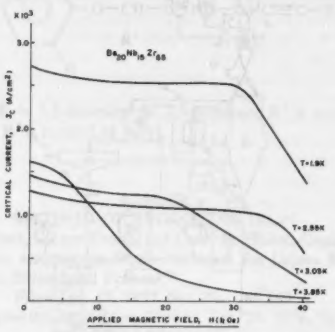
GLASSY SUPERCONDUCTING METAL ALLOYS IN THE BERYLLIUM-NIOBIUM-ZIRCONIUM SYSTEM

Ryusuke Hasegawa, Morristown, N.J., assignor to Allied Chemical Corporation, Morristown, N.J.

Continuation-in-part of Ser. No. 749,953, Dec. 13, 1976, abandoned. This application Aug. 5, 1977, Ser. No. 822,019

Int. Cl.[2] C22C *1/00, 14/00*

U.S. Cl. 75—177 **7 Claims**



1. A metal alloy consisting essentially of about 20 to 45 atom percent beryllium, about 2.5 to 20 atom percent niobium and the balance essentially zirconium and incidental impurities.

4,116,688

ALLOY AND STRUCTURES MADE THEREFROM

William Thomas Kaarlela, Fort Worth, Tex., assignor to General Dynamics Corporation, Fort Worth, Tex.

Filed Dec. 24, 1975, Ser. No. 643,992

Int. Cl.[2] C22C *1/09*

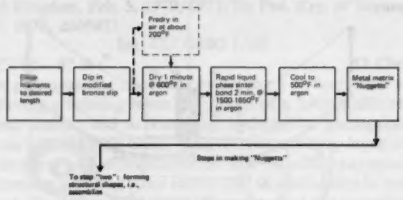
U.S. Cl. 75—229 **2 Claims**

1. A liquid phase sintered alloy for bonding together or to a substrate a plurality of high hardness boron filaments so as to hold the filaments in a solid, tough, metals matrix which supports and maintains the integrity of the filaments which comprises:

an alloy of a mixture of metals consisting essentially of
copper in an amount of about 68%,
tin in an amount of about 25%, and
titanium in an amount of about 7%,
all by weight of the alloy;
said alloy being produced from a slip containing about 4

parts of said metals mixture, the metals being in powdered substantially elemental form, and about 1 part of about a ½% to about 1% liquid solution of a hydrocolloid suspension agent by

preheating said slip in a non-oxidizing protective atmosphere at about 1 minute at about 600° F. to purify the slip by removing the liquid and the suspension agent therefrom;



liquid phase sintering said purified slip for about 2 minutes in a non-oxidizing protective atmosphere at from about 1500° F. to 1650° F.; and

cooling said liquid phase sintered purified slip in a non-oxidizing protective atmosphere.

4,116,689

MATERIAL AND METHOD FOR SECURING BORON FILAMENTS TO EACH OTHER AND TO A SUBSTRATE AND CUTTING TOOLS THEREFROM

William Thomas Kaarlela, Fort Worth, Tex., assignor to General Dynamics Corporation, Fort Worth, Tex.

Filed Dec. 24, 1975, Ser. No. 644,005
Int. Cl.² C22C *1/09*
U.S. Cl. 75—229 **10 Claims**

1. A liquid-phase-sintered alloy for secure attachment of boron filaments to other like filaments and to metallic substrate materials so as generally to encase and fix the filaments in a tough, solid supporting alloyed metals matrix capable of maintaining the integrity of the boron filaments which consists essentially of:

(A.) metallic copper in an amount of between about 60% to about 75% copper by weight of the alloy;

(B.) metallic tin in an amount of between about 20% to about 35% by weight of the alloy; and

(C.) the remainder being essentially metallic titanium in an amount of between about 3% to about 15% by weight of the alloy;

the copper, tin and titanium being alloyed from powder form by a liquid-phase-sintering whereby the copper and titanium remain substantially unliquified.

3. A composition of matter having therein intact boron filaments surrounded along their lengths by a metal alloy to produce a boron-filament-containing tool structure comprising:

A. a plurality of generally closely spaced apart boron filaments for presenting an array of sharp filament ends at a working surface of the tool;

B. said filaments substantially encased in a liquid-phase-sintered metallic matrix material consisting essentially of:

(1) metallic copper in an amount between about 60% to about 75% by weight of the mixture,

(2) metallic tin in an amount between about 20% to about 35% by weight of the mixture, and

(3) the remainder being substantially titanium in an amount of between about 3% to about 15% by weight of the mixture;

said copper-tin-titanium mixture being alloyed about said filaments by liquid phase sintering during which the copper and titanium remain substantially unliquified to produce a composition of matter wherein the filaments are firmly held substantially undegraded in a strong, tough metallic matrix material effective to support the filaments in an end-on array of the filament ends for cutting, grinding or abrading tool operations.

4,116,690

FLUX FOR USE IN ELECTROSLAG REFINING PROCESS

Satish Vishwanath Joshi, Kokomo, Ind., and Douglas Lee Bracher, Downingtown, Pa., assignors to Lukens Steel Company, Coatesville, Pa.

Filed Jan. 21, 1977, Ser. No. 760,863
Int. Cl.² C22B *9/10*
U.S. Cl. 75—257 **3 Claims**

1. A flux used in an electroslag refining process which provides good desulfuration and substantially precludes the introduction of hydrogen into the liquid metal pool, the flux containing:

40 - 70% Calcium Fluoride (CaF_2),

15 - 35% Aluminum Oxide (Al_2O_3),

5 - 20% Bastnasite, a mixed rare-earth fluocarbonate mineral.

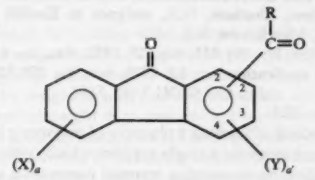
4,116,691

ELECTROPHOTOGRAPHIC IMAGING MEMBER OF MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS

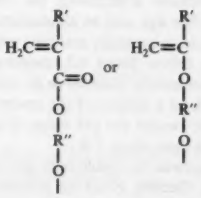
Sam R. Turner, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 596,690, Jul. 16, 1975, Pat. No. 4,062,866.
This application May 23, 1977, Ser. No. 799,626
Int. Cl.² G03G *5/04, 5/09*
U.S. Cl. 96—1.5 R **2 Claims**

1. An electrophotographic imaging member comprising a conductive substrate and a photoconductive insulating layer containing a polymer comprising the product of the addition polymerization of at least one monomer represented by the structural formula



wherein R is



wherein

R′ is hydrogen or methyl;

R″ is alkyl of 1–10 carbon atoms;

X and Y are independently selected from the group consisting of NO_2, halogen and $—CF_3$; and

a and *a′* may be from 0–3.

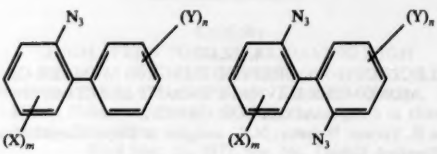
4,116,692

PHOTOGRAPHIC METHOD UTILIZING A PHOTOSENSITIVE COMPOSITION CONTAINING A 2-AZIDOBIPHENYL AND A TRIPLET SENSITIZER

Akira Yabe, Fujisawa, and Koichi Honda, Tokyo, both of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Mar. 11, 1977, Ser. No. 776,896
Claims priority, application Japan, Jun. 7, 1976, 51-066257
Int. Cl.[2] G03C *5/04, 1/58, 1/52*
U.S. Cl. 96—27 E 5 Claims

1. A method for obtaining a stable image on a photosensitive coating of a composition containing at least a main photosensitive component, an aromatic carbonyl triplet sensitizer in a sensitizing amount triplet sensitizer and a polymer as binder, comprising forming the image on the photosensitive coating through imagewise expasing onto the coating a light of a certain wave length, followed by fixing the image through uniformly exposing the coating containing said image with a light of a wave length different from said certain wave length, said main photosensitive component comprising at least a compound selected from the group consisting of a 2-azidobiphenyl and a derivative thereof represented by the following formulas:



wherein X and Y represent the same or different substituents, *m* and *n* represent integers of 0 to 4.

4,116,693

PHOTO-IMAGING UTILIZING ALKALI-ACTIVATED PHOTOPOLYMERIZABLE COMPOSITIONS

Steven Levinos, Chatham, N.J., assignor to Keuffel & Esser Company, Morristown, N.J.

Division of Ser. No. 291,851, Sep. 25, 1972, Pat. No. 4,012,256. This application Sep. 13, 1974, Ser. No. 505,720
Int. Cl.[2] G03C *5/00, 5/04*
U.S. Cl. 96—35.1 3 Claims

1. The method of forming a plurality of polymeric images at widely spaced times on a single support which comprises:

(a) providing photo-imaging material comprising a support and a coating thereon of a composition comprising:
  (1) an ethylenically unsaturated polymerizable compound,
  (2) a photo-initiator comprising the combination of a photo-reducible dye and an alkanolamine, and;
  (3) sufficient acid to normally maintain said composition at a pH value below about 4.5, thereby rendering said material substantially insensitive to visible light;

(b) alkalizing at least a section of the coated composition of said material to render the pH value of said composition section greater than about 7.0;

(c) exposing imagewise to visible light said alkalized composition section, thereby effecting polymerization of said composition and forming a first polymeric image in light-exposed areas;

(d) fixing said polymeric image by effecting a reduction in the pH value of the alkalized section of said composition to below about 4.5; and

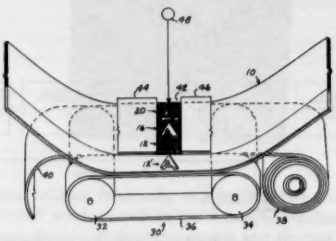
(e) thereafter repeating said alkalizing, exposing, and fixing steps to thereby effect the formation of each additional one of said plurality of images on said support.

4,116,694

COLOR SEPARATED FILM STRIP TYPE FONT

Thomas L. Byers, 3004 SE. 21, Oklahoma City, Okla. 73115

Filed Mar. 23, 1977, Ser. No. 780,631
Int. Cl.[2] G03C *5/04;* G03B *15/00*
U.S. Cl. 96—41 2 Claims



1. A method of preparing a plurality of camera ready positive proof strips having printing registered type font characters and color separated components, comprising:

a. providing a positive print strip of juxtaposed characters of a complete type font;

b. preparing an overlay strip containing supplemental color printing components for each character of the type font;

c. arranging said positive print strip and each said overlay strip in a common plane in superposed spaced-apart parallel relation;

d. photographically producing a single negative photographic transparency strip containing the superposed positive print strip and each overlay strip;

e. successively contact printing an elongated message forming strip of selected characters and their respective color components of the negative transparency; and,

f. longitudinally dividing the contact printed strip to form a plurality of camera ready strips containing the selected characters and their color components, respectively.

4,116,695

METHOD OF PRODUCING A SUPPORT FOR A PRINTING PLATE

Teruo Mori, and Azusa Ohashi, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Continuation of Ser. No. 613,010, Sep. 12, 1975, abandoned. This application Apr. 13, 1977, Ser. No. 787,119
Claims priority, application Japan, Sep. 12, 1974, 49-105291
Int. Cl.[2] G03C *1/94;* G03F *7/02*
U.S. Cl. 96—86 P 21 Claims

1. A method of producing a printing plate which comprises:

a. oxidizing an aluminum plate by anodizing;

b. etching the resulting oxidized aluminum plate;

c. treating the oxidized, etched aluminum plate with hot water at about 70° C. to 130° C. or with water vapor to form a printing plate support;

d. applying an unexposed photosensitive material in layer form to the product of step (c), whereby undesirable increased adhesion between the printing plate support and the photosensitive material with the passage of time is minimized.

4,116,696
PHOTOGRAPHIC MATERIAL

Sumitaka Tatsuta; Masuhiko Hirose, and Hiroshi Amari, all of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation-in-part of Ser. No. 547,682, Feb. 6, 1975, abandoned. This application Dec. 6, 1976, Ser. No. 748,030

Claims priority, application Japan, Feb. 6, 1974, 49-15107; United Kingdom, Feb. 5, 1975, 4972/75; Fed. Rep. of Germany, Feb. 6, 1975, 2505017

Int. Cl.[2] **G03C** *1/80*

U.S. Cl. 96—87 R **11 Claims**

1. A photographic material comprising a hydrophobic support having a subbing layer comprised of a hydrophilic resin adjacent thereto and at least one hydrophilic photographic layer on said subbing layer, wherein said subbing layer contains droplets of a non-volatile or low volatile hydrophobic liquid having a boiling point above 120° C, a solubility in water of about 10g/100g water, at 25° C, or less and not completely miscible with the subbing layer, said droplets having a diameter of between about 0.01 and 1 micron and less than the thickness of said subbing layer and being present in an amount of from 1/5 to 3 times by volume to the volume of the subbing layer resin on a dry basis.

11. A photographic material comprising a hydrophobic support having a subbing layer comprised of a hydrophilic resin adjacent thereto and at least one hydrophilic photographic layer on said subbing layer, wherein said subbing layer contains droplets consisting essentially of a non-volatile or low volatile hydrophobic liquid having a boiling point above 120° C, a solubility in water of about 10g/100g water, at 25° C, or less and not completely miscible with the subbing layer, said droplets having a diameter of between about 0.01 and 1 micron and less than the thickness of said subbing layer and being present in an amount of from 1/5 to 3 times by volume to the volume of the subbing layer resin on a dry basis.

4,116,697
SULFUR-SUBSTITUTED ISOTHIOUREAS IN SILVER HALIDE EMULSIONS

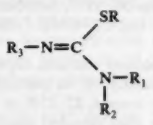
John Howard Bigelow, Rochester, N.Y., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 751,586, Dec. 17, 1976, abandoned. This application Jan. 20, 1978, Ser. No. 871,114

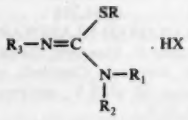
Int. Cl.[2] **G03C** *1/06, 1/28*

U.S. Cl. 96—95 **10 Claims**

1. A light-sensitive silver halide photographic element comprising a support coated with a silver halide emulsion containing a sulfur-substituted isothiourea of the formula:

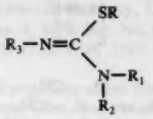


or its hydrohalide salt having the formula

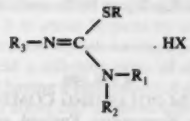


where R, R_1, R_2, and R_3 are each selected from the group consisting of alkyl, aryl, hetero, substituted alkyl, and substituted aryl, and wherein R_1 may optionally represent H, and X is iodine or chlorine, said isothiourea or its salt being employed in an amount sufficient to increase the Dmax and contrast of the silver halide emulsion.

9. A light-sensitive silver halide photographic element comprising a support coated with a silver halide emulsion containing a sulfur-substituted isothiourea of the formula:



or its hydrohalide salt having the formula



wherein R is selected from the group consisting of alkyl, aryl, and substituted aryl; R_1, R_2, and R_3 are each selected from the group consisting of alkyl, aryl, hetero, substituted alkyl, and substitued aryl, and wherein R_1 may optionally represent H, and wherein R_2 and R_3 may form a ring of two or more $>CH_2$ groups in which one or more of the H atoms may be substituted by R, and wherein X is iodine or chlorine, said isothiourea or its salt being employed in an amount sufficient to increase the Dmax and contrast of the silver halide emulsion.

4,116,698
FERROCYANATE TREATING LIQUID FOR OFFSET MASTER

Hazime Machida; Hiroshi Tamura, and Kakuji Murakami, all of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 749,385, Dec. 10, 1976, abandoned. This application Sep. 23, 1977, Ser. No. 836,055

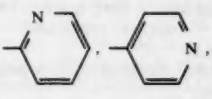
Claims priority, application Japan, Dec. 19, 1975, 50-150537

Int. Cl.[2] **C09D** *5/20;* **C09K** *3/00;* **G03G** *13/00*

U.S. Cl. 106—2 **10 Claims**

1. A liquid for treating offset masters which consists essentially of an aqueous solution containing more than 0.2 percent by weight of water-soluble ferrocyanate, from 0.1 to 12.0 percent by weight of water-soluble phosphate and from 0.1 to 10 percent by weight of at least one hydrophilic resin selected from the group consisting of (1) homopolymers of monomers having the formula I, (2) copolymers of different monomers having the formula I and (3) copolymers of monomer having the formula I and monomer having the formula II, wherein each of (1), (2) and (3) has a degree of polymerization of from 10 to 1000:

wherein R_1 is —H or $—CH_3$, and R_2 is $—CONH_2$, $—CONHR_3$, $—CON(R_3)_2$, $—CONHCH_2OH$,



$—COO(CH_2)_2N(CH_3)_2$ or $—COO(CH_2)_2N(C_2H_5)_2$, and R_3 is alkyl having 1 to 8 carbon atoms;

wherein R_4 and $R_{4'}$ are —H, —CH_3, —COOH, —$COOR_6$ or —COOMe; R_5 and $R_{5'}$ are —H, —CH_3, —COOH, —$COOR_6$, —COOMe or —CH_2COOH, R_6 is —CH_3 or —C_2H_5 and Me is Mg, Ba, Ca, Co, Mn, Fe, Ni or Zn, with the provisos that when R_4 and $R_{4'}$ are the same, R_5 is not the same as R_5, and that when R_4 is not the same as $R_{4'}$, R_5 can be the same as or different from $R_{5'}$.

4,116,699

ALUMINIUM POLISHING COMPOSITIONS

Terence R. Rooney, Bromsgrove, England, assignor to Albright & Wilson Ltd., Warley, England

Filed Oct. 18, 1976, Ser. No. 733,508

Claims priority, application United Kingdom, Oct. 20, 1975, 42902/75

Int. Cl.² C09K *13/06*

U.S. Cl. 106—3 **11 Claims**

1. An aluminum polishing solution consisting essentially of

(a) phosphoric and sulphuric acid in a relative proportion of from 1.5:1 to 1:1.5, measured as 40 percent P_2O_5 pnosphoric acid and 98 percent sulphuric acid and together constituting at least 90 percent of the total composition;

(b) nitric acid in a proportion by weight of from 1.2 to 4.2 percent as 100 percent nitric acid;

(c) dissolved copper in a concentration of from 0.01 to 0.2 percent by weight;

(d) dissolved aluminum in a concentration of between zero and saturation;

(e) from 0.05 percent to 0.7 percent by weight of an organic etch inhibitor which is a bath soluble organic compound having an aromatic ring selected from the group consisting of benzene, naphthalene, benzoquinone, pyridine, pyrazine, and melamine rings and at least 2 hetero atoms selected from the group constituting nitrogen oxygen and sulphur atoms conjugated with said aromatic ring; and

(f) the balance substantially of water.

4,116,700

PROCESS FOR HARDENING PHOTOGRAPHIC LAYERS

Wolfgang Himmelmann, Leverkusen, Germany, assignor to AGFA-Gevaert, A.G., Leverkusen-Bayerwerk, Germany

Filed Apr. 11, 1977, Ser. No. 786,470

Claims priority, application Fed. Rep. of Germany, Apr. 14, 1976, 2616376

Int. Cl.² G03C *1/30*

U.S. Cl. 96—111 **10 Claims**

1. A process of hardening a layer containing protein in a photographic material having at least one layer containing a light sensitive silver halide comprising incorporating a hardening amount of a hardener in the layer to be hardened

wherein the improvement comprises the hardener is partially hydrolyzed bis(dichlorotriazin-2-yl)-alkylamines or -arylamines.

4,116,701

METAL CORROSION INHIBITOR

Alvin J. Conner, Sr., P.O. Box 8118, New Orleans, La. 70182

Filed Mar. 8, 1977, Ser. No. 775,425

Int. Cl.² C09D *5/08*

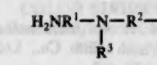
U.S. Cl. 106—14.14 **5 Claims**

1. A volatile metal corrosion inhibitor prepared by adding to water, by weight:

(a) 5–12 parts of an alkali metal nitrite;

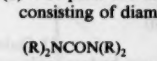
(b) 2–6 parts of ammonium benzoate;

(c) 4–10 parts of an alkylalkanolamine of the formula:



where R^1 and R^2 are independently alkylidene of 1–4 carbon atoms and R^3 is hydrogen or alkyl of 1–4 carbon atoms, and

(d) 4–10 parts of a nitrogenous base selected from the group consisting of diamides of the formula:



where R is independently hydrogen or alkyl of 1–6 carbon atoms; carbamates, guanidine and diguanidine; the total amount of (a)–(d) and water being 100 parts and the total amount of (a), (b), (c) and (d) being not greater than 25 parts per said 100 parts.

4,116,702

AGENT FOR FLAME PROOFING SYNTHETIC FIBROUS MATERIAL

Peter Rohringer, Basel; Frank Lohmann, Arlesheim, and Rudolf F. Wurster, Pfeffingen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 532,448, Dec. 13, 1974, abandoned. This application Sep. 15, 1976, Ser. No. 723,279

Int. Cl.² C09D *5/18*

U.S. Cl. 106—15 FP **4 Claims**

1. A flameproofing agent consisting essentially of 200 to 700 g/kg of a 1,2,5,6,9,10-hexabromocyclododecane (b) 0.1 to 300 g/kg of a dispersant selected from the group consisting of lignin sulphonates, ethyleneoxy adducts of alkylphenols, fatty amines, fatty alcohols or fatty acids, aromatic sulphonic acids or condensation products thereof with formaldehyde, saturated aliphatic dicarboxylic acids with long-chain alkyl radicals, sulphated substituted benzimidazoles or sulphonated fatty acid amides, (c) 0 to 30 g/kg of a protective colloid selected from the group consisting of polyvinyl alcohol, hydroxyethyl cellulose or carboxymethyl cellulose, and (d) water in order to bulk the flameproofing agent to 1 kg, said flameproofing agent being present in form of an aqueous dispersion, whose particles have an average diameter of 1 to 30 μ.

4,116,703

COMPOSITE FOAMABLE CEMENTS

John L. Stempin, Beaver Dams, and Dale R. Wexell, Corning, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Sep. 30, 1977, Ser. No. 838,088

Int. Cl.² C04B *7/02*

U.S. Cl. 106—75 **7 Claims**

1. An inorganic cement mixture, capable of being foamed, and consisting essentially of, in percent by weight, 8–20% crystalline hydraulic cement, 22–35% of a hydraulic cement in the form of a silicate glass powder, and 45–70% of quaternary ammonium silicate solution.

4,116,704

COLORED GLASSWARE

David C. Boyd; James E. Flannery; David W. Morgan, all of Corning; Sara E. Rosplock, Campbell, and Stella A. Sczerbaniewicz, Corning, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Continuation-in-part of Ser. No. 809,325, Jun. 23, 1977, abandoned. This application Feb. 6, 1978, Ser. No. 875,200

Int. Cl.² C03C *3/08*

U.S. Cl. 106—54 **3 Claims**

1. A clear, light gray-brown glass exhibiting a spectral transmittance curve approximating that set forth in FIG. 6, FIG. 8, and FIG. 9 having a composition consisting essentially, in parts by weight on the oxide basis, of about 4.7–5.15 Na_2O, 2–2.21 Al

$_2O_3$, 12.35–14.16 B_2O_3, 78.0–80.0 SiO_2, 0.001–0.006 Co_3O_4, 0.037–0.055 NiO, and 0.21–0.6 MnO_2.

4,116,705

DETOXIFICATION

Christopher Lee Chappell, Sale, England, assignor to Stablex AG, Zug, Switzerland

Continuation of Ser. No. 474,754, May 30, 1974, abandoned. This application Jun. 14, 1976, Ser. No. 695,670

Claims priority, application United Kingdom, Jun. 1, 1973, 26201/73

Int. Cl.[2] C04B *7/02*

U.S. Cl. 106—90 **9 Claims**

1. A process for detoxifying a hazardous essentially liquid waste which process comprises forming a flowable essentially aqueous slurry containing at least 20% water by mixing with the said waste while in essentially liquid form a material comprising Portland cement powder and an aluminum silicate powder or alumino-silicate powder or a mixture of said powders, said slurry thereafter setting into a detoxified frigid rock-like mass.

4,116,706

ADDITIVE COMPOSITION FOR HYDRAULIC CEMENT COMPOSITIONS

Robert W. Previte, Lawrence, Mass., assignor to W. R. Grace & Co., Cambridge, Mass.

Filed Jul. 1, 1977, Ser. No. 812,211

Int. Cl.[2] C04B *7/35*

U.S. Cl. 106—90 **27 Claims**

1. A set-accelerating, compressive strength-enhancing additive composition for hydraulic cement compositions, said additive composition consisting essentially of (a) a major amount of a chloride, formate or nitrite salt set-acclerating agent or mixture thereof, (b) from about 1 to about 6 percent by weight of an amine, and (c) from about 0.15 to about 3 percent by weight of a synthetic surface active agent having the following characteristics:

(1) a cloud point as defined herein not exceeding about 80° centigrade; and (2) a mechanically-induced agitated foam height as defined herein of less than about 30 millimeters.

4,116,707

RAW MIXTURE FOR PRODUCING REFRACTORY ALUMINOUS CEMENT

Pavel Alexandrovich Oborin, Chilanzar, kvartal 8, 34, kv. 44; Anatoly Yakovlevich Gadaev, kvartal TS-5, 41, kv. 24; Marsel Yanovich Bikbau, massiv Junus-Abad, B-2, 21, kv. 58; Boris Izrailovich Nudelman, Chilanzar, kvartal 8, 27, kv. 48; Irina Zelmanovna Aronova, kvartal TS-6, 96, kv. 18; Nail Yakubovich Bulatov, Chilanzar, kvartal 10, 19, kv. 31, and Lev Matveevich Sosenko, Chilanzar, kvartal 23, 69, kv. 4, all of Tashkent, U.S.S.R.

Filed May 2, 1977, Ser. No. 792,914

Int. Cl.[2] C04B *7/32*

U.S. Cl. 106—104 **6 Claims**

1. A raw mixture for the production of a refractory aluminous cement consisting of a basic component selected from the group consisting of barium carbonate and strontium carbonate, an acidic component selected from the group consisting of alumina and a mixture of alumina with zirconia in a ratio of from 1:14 to 5:1 respectively, and a chloride of at least one of the metals selected from the group consisting of barium, strontium, sodium, potassium; said components being contained in the following proportions percent by mass:

basic component	40 to 62
chlorides of said metals	5 to 20
acidic component	the balance.

4,116,708

ASPHALT COATING COMPOSITIONS

Gilbert W. Tarver, and Russell E. Koons, both of El Dorado, Ark., assignors to Lion Oil Company, Los Angeles, Calif.

Filed Sep. 4, 1975, Ser. No. 610,456

Int. Cl.[2] C08K *3/26, 3/36, 3/40;* **C08L** *95/00*

U.S. Cl. 106—281 R **4 Claims**

2. A composition comprising about 80% to about 95%, by weight, of inert mineral filler, and, from about 5% to about 20%, by weight, of an asphalt blend consisting essentially of about 70 to about 92 parts by weight of an air-blown, solvent extracted asphalt having a penetration of about 0 to 7, and a softening point of about 200° to about 250° F., and, correspondingly, about 8 to about 30 parts by weight of a non-air-blown, solvent extracted asphalt having a penetration of about 40 to about 150, and a softening point of about 105° to about 130° F., said blend having a penetration of about 7 to about 15, a softening point of about 200° to about 220° F., and a ductility of at least about 2.5 cm.

4,116,709

PATCH MATERIAL FOR CHUCK HOLES IN PAVEMENT

Michael Donald La Bate, 115 Hazen Ave., Ellwood City, Pa. 16117

Filed Nov. 3, 1976, Ser. No. 738,617

Int. Cl.[2] C08L *95/00;* **C09D** *3/24*

U.S. Cl. 106—284 **5 Claims**

1. A metal producing material for filling chuck holes in pavements consisting of a mixture comprising between about 10% and 20% pitch, between about 20% and 25% refractory particles, and exothermic materials which comprise between about 37% and 60% iron scale and between about 10% and 18% aluminum particles, the iron scale and aluminum particles being present in amounts sufficient to form an exothermic reaction when ignited to melt the iron in the scale and form a molten liquid which includes the refractory particles therein.

4,116,710

METALLIC PARTICULATE

Henrik R. Heikel, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 409,356, Oct. 24, 1973, abandoned, which is a continuation-in-part of Ser. No. 315,170, Dec. 14, 1972, abandoned. This application Feb. 5, 1975, Ser. No. 547,146

Int. Cl.[2] C04B *31/18*

U.S. Cl. 106—290 **21 Claims**

1. A method comprising providing a substrate with a coating on at least a portion of the substrate, the coating consisting essentially of an about 200 to about 600 angstrom thick vapor deposited metal layer, dissolving the substrate to separate at least a portion of the coating from the substrate to provide a plurality of generally separate irregularly shaped metal platelets with a largest dimension up to about 5000 microns, and introducing the metal platelets into a carrier suitable for use in a coating composition.

4,116,711

NON-DUSTING COLORING AGENT AND METHOD OF MANUFACTURE

Fitzhugh Lee Avera, 1809 Yale Dr., Alameda, Calif. 94501

Continuation-in-part of Ser. No. 590,420, Jun. 26, 1975, abandoned. This application Jan. 10, 1977, Ser. No. 758,076

Int. Cl.[2] C09C *3/08*

U.S. Cl. 106—309 **10 Claims**

1. A process for forming a finely divided pigment into relatively larger particles by means of an organic pigment binder, said process comprising the following steps:

(a) dissolving about 2–20% by weight of a hexahydric alcohol of the formula $CH_2OH(CHOH)_4CH_2OH$ having a melting point within the range of 60°–200° C. in an aqueous carrier medium, the amount of water in said aqueous carrier medium being sufficient to provide at least 100

parts by weight of water per 21.3 parts by weight of hexahydric alcohol dissolved in said aqueous medium;

(b) dispersing 80–98% by weight of finely divided pigment in said hexahydric alcohol-aqueous medium, whereby a castable blend comprising said pigment, said hexahydric alcohol, and water is obtained, the amount of water being at least 40 parts by weight per hundred parts by weight of said pigment;

(c) casting a continuous wet layer of said blend formed in step (b) onto a substrate to form a continuous wet layer of 0.1–5 millimeters in thickness;

(d) heating said wet layer to a temperature in excess of 100° C., said temperature being selected such that, when said temperature is reached and thereafter lowered, said hexahydric alcohol will come out of solution to form a solid hexahydric alcohol matrix containing therein said pigment in suspension, said exposure to temperatures in excess of 100° C. being sufficient to assure that said matrix contains less than 0.5% chemically unassociated water by weight;

(e) removing the resulting coherent dried layer from said substrate; and

(f) comminuting said coherent dried layer to form generally flake-like particles with a thickness less than that of said continuous wet layer.

4,116,712

SOLVENT REFINING OF SUGAR

Donald F. Othmer, 333 Jay St., Brooklyn, N.Y. 11201

Filed Sep. 6, 1977, Ser. No. 830,578
Int. Cl.[2] C13D *1/14*
U.S. Cl. 127—46 R **19 Claims**

1. In the process of removing impurities from an original mixture with sugar and from 0.2% to 45% water, the steps comprising:

(a) counter current contacting said water-sugar mixture with a solvent mixture comprising acetone and a second liquid selected from the group consisting of ethanol and acetic acid;

(b) transferring by said counter current contacting said impurities from said original sugar-water mixture to said solvent mixture, and some part of said solvent mixture to said sugar-water mixture;

(c) removing from said counter current contacting operation a second sugar-water mixture containing less of said impurities than was present in said original sugar-water mixture, and some part of said solvent mixture;

(d) separating off for reuse said solvent mixture from said second sugar-water mixture containing less of said impurities;

(e) removing from said counter current contacting operation a solvent-extract liquid containing said solvent mixture and said impurities removed from said original sugar-water mixture; and

(f) evaporating off for reuse said solvent mixture from said solvent-extract liquid, thereby producing a first solvent-extract molasses containing said impurities.

4,116,713

ACID CLEANER AND PROCESS FOR DISPOSAL THEREOF

Joseph V. Otrhalek, Dearborn; Gilbert S. Gomes, Southgate, and Robert E. Gansser, Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Division of Ser. No. 677,554, Apr. 16, 1976, Pat. No. 4,032,466.
This application May 26, 1977, Ser. No. 800,995
Int. Cl.[2] B08B *3/08*
U.S. Cl. 134—3 **4 Claims**

1. In a process for cleaning heavy vehicles and the like comprising the step of contacting the vehicle with an acid cleaning composition consisting essentially of a concentrated composition diluted with from 1 to 9 parts of water per part of concentrate, said concentrated composition consisting essentially of

(1) an aqueous inorganic acid in an amount from about 5 to about 78 weight percent,

(2) an organic acid selected from the group consisting of oxalic, tartaric, citric acid and mixtures thereof in an amount from about 1 to about 6 weight percent,

(3) a nonionic surfactant in an amount from about 7 to about 23 weight percent,

(4) an anionic surfactant in an amount from about 1 to about 7 weight percent, and

(5) water in an amount from about 75 to about 12 weight percent; all weight percents being based on the total concentrated composition, provided that the said nonionic surfactant and the said anionic surfactant when taken together constitute from about 10 to about 30 weight percent of said concentrated composition and said nonionic surfactant constitutes from about 75 to about 90 weight percent of the combined weight percent of nonionic and anionic surfactants;

the improvement comprising the steps of adding to said concentrated composition from about 1 to about 12 percent by weight of the total concentrated composition of a flocculating agent containing bivalent iron, trivalent iron or trivalent aluminum in soluble form in acid solution prior to the step of contacting the vehicle with the acid cleaning composition, and after using the acid cleaning composition to clean the vehicle, raising the pH of the used cleaning composition an amount sufficient to generate hydroxide flocs from the flocculating agent present.

4,116,714

POST-POLISHING SEMICONDUCTOR SURFACE CLEANING PROCESS

Jagtar Singh Basi, Fishkill, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 15, 1977, Ser. No. 824,382
Int. Cl.[2] B08B *3/08*
U.S. Cl. 134—3 **8 Claims**

1. In a method for cleaning a semiconductor surface following polishing of said surface with a polishing slurry containing a colloidal silica abrasive, the improvement comprising removing silica residue by contacting the surface with an aqueous phosphoric acid solution containing about 10 to 50 percent by weight phosphoric acid at a temperature of about 20° to 30° C. and then removing the solution from said surface.

4,116,715

METHOD FOR REMOVING PHOTOPOLYMERS FROM METAL SUBSTRATES

Frank J. Smiggen, 350 Glenview Dr., #14, San Francisco, Calif. 94131; Devitt S. Burry, 311 Corbett #8, San Francisco, Calif. 94114; Joseph Kallaby, 350 Glenview Dr. #10, San Francisco, Calif. 94131, and Wayne H. Goltz, 1516 NE. 26th St., Wilton Manors, Fla. 33308

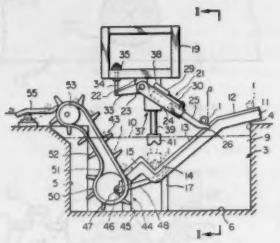
Filed Jul. 18, 1977, Ser. No. 816,446
Int. Cl.[2] B08B *1/00, 3/10*
U.S. Cl. 134—6 **6 Claims**

1. A method of completely removing a developed photopolymer layer from a support substrate of a photopolymer printing plate, said layer comprising developed photopolymer polymerized by photoinitiation from at least one water-soluble ethylenic monomer and a water-soluble polymer having both acetyl and hydroxy functional groups, said method consisting essentially of immersing the developed photopolymer plate layer in a bath consisting essentially of boiling water for sufficient time to swell the layer and then scraping the swollen layer from the substrate.

4,116,716
IMMERSION COOLING APPARATUS FOR HOT METAL PIPES

Kametaro Itoh; Wataru Takahashi; Yoshun Yamamoto, and Hachiro Harajiri, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Mar. 14, 1977, Ser. No. 777,547
Claims priority, Application, Japan, Dec. 29, 1976, 51-160719
Int. Cl.[2] B08B *9/02*
U.S. Cl. 134—134 8 Claims



1. An immersion cooling apparatus for hot metal pipes comprising:
- a cooling tank for containing a body of cooling liquid in which the pipes are to be immersed for cooling;
- a plurality of skids extending from outside of the cooling tank downwardly into the cooling tank to a level below the level of the surface of the cooling liquid and being spaced in the direction of the length of the cooling tank for guiding the pipe into the tank along the skids;
- pipe supporting means in the tank at the lower end of said skids for supporting a pipe thereon;
- a pipe leveling means having pipe holding members which cross said skids and means on which said holding members are mounted for moving said holding members for causing a pipe moving downwardly along the skids into the tank to remain in a horizontal position;
- a cooling liquid nozzle in said tank aligned with the position of the axis of a pipe supported in said pipe supporting means and spaced from the adjacent end of a pipe supported in said pipe supporting means for injecting cooling liquid into the pipe, the space between the end of said cooling liquid nozzle and the position of the end of the pipe being such that cooling liquid around the end of a pipe will be sucked into the pipe and discharged from the other end of the pipe by the jet from the cooling liquid nozzle; and
- a source of cooling liquid under pressure connected to the cooling liquid nozzle for supplying cooling liquid to the cooling liquid nozzle.

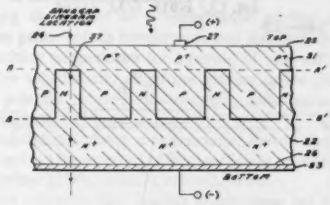
4,116,717
ION IMPLANTED EUTECTIC GALLIUM ARSENIDE SOLAR CELL

William P. Rahilly, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 8, 1976, Ser. No. 748,584
Int. Cl.[2] H01L *31/06*
U.S. Cl. 136—89 SJ 3 Claims

1. A solar cell comprising:
- a. a wafer formed of a crystal of eutectic gallium arsenide having a plurality of alternating P and N doped regions forming a plurality of vertical PN junctions between a top and a bottom surface thereof;
- b. a P+ region formed by multiple ion implantation into the said top surface of at least three P dopant implantation shots of progressively larger and larger ion doses with correspondingly lower and lower implant energies whereby the location of the maximum dopant density is substantially at the said top surface, and pulsed electron beam annealed;
- c. an N+ region formed by multiple ion implantation into the said bottom surface of at least three N dopant implantation shots of progressively larger and larger ion doses with correspondingly lower and lower implant energies whereby the location of the maximum dopant density is substantially at the said bottom surface, and pulsed electron beam annealed;
- d. a metallization contact positioned on the P+ region formed on said top surface;
- e. a metallization contact positioned on the N+ region formed on said bottom surface.

3. The method of forming a solar cell on a wafer of eutectic gallium arsenide having a plurality of vertical PN junctions formed between a top surface and a bottom surface there of comprising the steps of:
- a. implanting, using at least three implant steps, a P-type impurity in said top surface by implanting progressively

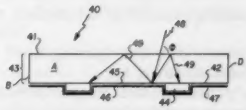


larger and larger implantation doses over the range of approximately 10^{14} ions/cm^2 to 10^{16} ions/cm^2 with correspondingly lower and lower energy levels over the range of approximately 50 kev to 5 kev, providing a maximum dopant density of P+ atoms substantially at the said top surface;
- b. implanting, using at least three implant steps, an N-type impurity in said bottom surface by implanting progressively larger and larger implantation doses over the range of approximately 10^{14} ions/cm^2 to 10^{16} ions/cm^2 with correspondingly lower and lower energy levels over the range of approximately 50 kev to 5 kev, providing a maximum dopant density of N+ atoms substantially at the said bottom surface;
- c. annealing the said top and bottom surfaces with a pulsed electron beam;
- d. metallizing a contact to the P+ region formed on said top surface; and
- e. metallizing a contact to the N+ region formed on said bottom surface.

4,116,718
PHOTOVOLTAIC ARRAY INCLUDING LIGHT DIFFUSER

John W. Yerkes, Granada Hills, and James E. Avery, Burbank, both of Calif., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Mar. 9, 1978, Ser. No. 884,861
Int. Cl.[2] H01L *31/04*
U.S. Cl. 136—89 PC 24 Claims



1. A photovoltaic array comprising a light transmitting

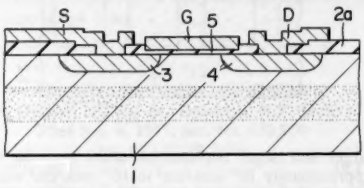
member having at least one pair of opposed essentially parallel sides, each of said sides being joined by an edge face, a plurality of photovoltaic cells adapted to receive radiation transmitted through said member carried on at least one of said sides, said cells having interstices therebetween, and a light diffusive member on said at least one side covering at least part of said interstices whereby at least a part of the light internally reflected by said diffusive member is caused to impinge on said photovoltaic cells, thereby increasing photovoltaic conversion efficiency.

4,116,719

METHOD OF MAKING SEMICONDUCTOR DEVICE WITH PN JUNCTION IN STACKING-FAULT FREE ZONE

Hirofumi Shimizu, Kodaira; Akira Yoshinaka, Hamuramachi, and Yoshimitsu Sugita, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 8, 1977, Ser. No. 766,727
Claims priority, application Japan, Feb. 12, 1976, 51-13234
Int. Cl.[2] H01L *7/52, 11/14*
U.S. Cl. 148—1.5 **13 Claims**



1. A method of making a semiconductor device with a PN junction, comprising the steps of:

forming an oxidized layer on a major surface of a silicon semiconductor wafer by high temperature oxidation to produce stacking faults in the silicon semiconductor wafer;

annealing the silicon semiconductor wafer containing the stacking faults in a non-oxidizing atmosphere for a predetermined time and at a predetermined temperature effective to produce at least a zone of the silicon semiconductor wafer having a predetermined depth from said major surface substantially free from the stacking faults, thereby forming a stacking fault free zone having the predetermined depth; and

forming a PN junction having a depth shallower than said predetermined depth of said zone from said major surface in said zone of the silicon semiconductor wafer.

4,116,720

METHOD OF MAKING A V-MOS FIELD EFFECT TRANSISTOR FOR A DYNAMIC MEMORY CELL HAVING IMPROVED CAPACITANCE

Mark Alexander Vinson, San Diego, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Dec. 27, 1977, Ser. No. 864,247
Int. Cl.[2] H01L *27/04, 29/78, 21/265*
U.S. Cl. 148—1.5 **10 Claims**

4. A method of forming a field effect transistor comprising the steps of:

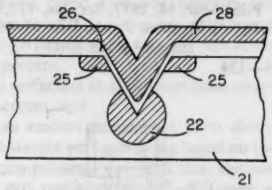
forming a masking layer over the surface of a crystalline substrate;

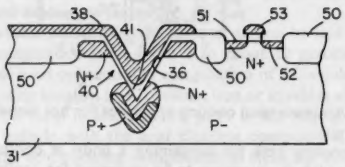
opening an aperture in said masking layer to expose said surface of said substrate;

applying an etchant to said exposed substrate to form a V-shaped recess in said substrate so that the recess is wider at said substrate surface than the aperture in said masking layer;

accellerating first ions of one conductivity type through said aperture in said masking layer for implantation in said substrate around the lower portion of said V-shaped recess;

subjecting said substrate to a thermal cycle to cause said first ions to diffuse inwardly into said substrate; and





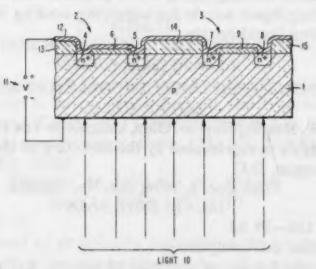
accellerating second ions of a second conductivity type through said aperture in said masking layer for implantation in said substrate around the lower portion of said V-shaped recess.

4,116,721

GATE CHARGE NEUTRALIZATION FOR INSULATED GATE FIELD-EFFECT TRANSISTORS

Tak Hung Ning, Yorktown Heights; Carlton Morris Osburn, Croton-on-Hudson, and Hwa Nien Yu, Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 25, 1977, Ser. No. 854,563
Int. Cl.[2] H01L *7/54, 21/265*
U.S. Cl. 148—1.5 **7 Claims**



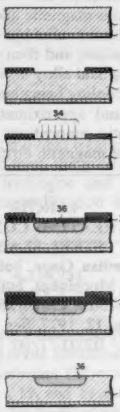
1. In the fabrication of arrays of insulating gate field-effect transistors the improvement comprising:

irradiating the substrate from the side opposite to the side on which the array is formed with light in a frequency range from the visible through the infrared while a voltage bias is maintained across the interface of the substrate and the oxide associated with each device in the array.

4,116,722
METHOD FOR MANUFACTURING COMPOUND SEMICONDUCTOR DEVICES

Kiyoo Kamei, Yokohama; Toshiaki Ikoma, Tokyo; Hirokuni Tokuda, Kawasaki, and Jeffrey Frey, Tokyo, all of Japan, assignors to Tokyo Shibaura Electric Co., Tokyo and Toshiaki Ikoma, Kawasaki, both of, Japan

Filed Aug. 18, 1977, Ser. No. 825,717
Claims priority, application Japan, Feb. 24, 1977, 52-18721
Int. Cl.[2] H01L *21/26*
U.S. Cl. 148—1.5 **6 Claims**

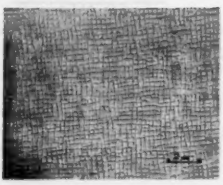


1. A method for manufacturing a semiconductor device comprising a step of preparing a compound semiconductor body, forming an oxidized film on a surface of said body by oxidizing said surface, heating said body with said oxidized film formed thereon, and forming an anodized film including said oxidized film on the surface of said body by anodizing said surface.

4,116,723
HEAT TREATED SUPERALLOY SINGLE CRYSTAL ARTICLE AND PROCESS

Maurice L. Gell, and David N. Duhl, both of Newington, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 17, 1976, Ser. No. 742,967
Int. Cl.[2] C22F *1/10*
U.S. Cl. 148—3 **7 Claims**



7. A method for producing nickel base superalloy single crystal articles which have a homogeneous microstructure and in which the gamma prime phase presents a refined morphology, including the steps of:

a. providing a mass of nickel base superalloy material which is free from intentional additions of a cobalt, carbon, boron, and zirconium; and which consists essentially of from about 5 to 18% chromium; at least 5% of an element chosen from the group consisting of from 2 to 8% aluminum and from 1 to 5% titanium and mixture thereof; at least 5% of an element chosen from the group consisting of up to 10% molybdenum, up to 15% tungsten, up to 12% tantalum, up to 3% columbium, up to 3.5% hafnium, up to 7% rhenium, and mixtures thereof; balance essentially nickel,

b. melting the nickel base superalloy and solidifying the alloy under conditions of unidirectional heat flow so as to produce a single crystal article having a microstructure which consists essentially of gamma prime particles in a gamma prime matrix, with the gamma prime particles having a particle size of about 1.5 microns, said article having an incipient melting temperature, in excess of about 2300° F., as a result of the absence of carbon, boron and zirconium, and a gamma prime solvus temperature, which is less than the incipient melting temperature, said microstructure being free of MC type carbides as a result of the absence of carbon and free from TCP phases, as a result of the absence of cobalt,

c. heating the article to a temperature greater than the gamma prime solvus temperature and less than the incipient melting temperature for a period of time sufficient to dissolve substantially all of the gamma prime phase into solid solution while simultaneously homogenizing the microstructure,

d. heating the article at a temperature below the gamma prime solvus for a period of time sufficient to reprecipitate the gamma prime phase in refined form,

whereby the reprecipitated gamma prime phase has a particle size of less than about 0.5 microns and the heat treated single crystal article has a temperature advantage of at least 30° F. over non-heat treated articles.

4,116,724
METHOD OF HEAT TREATING COBALT-CHROMIUM-MOLYBDENUM BASED ALLOY AND PRODUCT

Dieter Hirschfeld, and Manfred Müller, both of Essen, Fed. Rep. of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Fed. Rep. of Germany

Filed May 10, 1977, Ser. No. 795,526
Claims priority, application Fed. Rep. of Germany, May 15, 1976, 2621789
Int. Cl.[2] C22F *1/10*
U.S. Cl. 148—3 **10 Claims**

8. A method for heat treating a cast alloy consisting essentially of by weight 20 to 40% chromium, 2 to 12% molybdenum, up to 2% silicon, up to 5% manganese, up to 1% carbon, 0.1 to 1% nitrogen, and the remainder cobalt and the usual impurities inherent to the manufacturing process, comprising: subjecting the alloy to a heat treatment to homogenize the lattice of the alloy, and then rapidly quenching the alloy in order to prevent reformation of deposits in the lattice.

4,116,725
HEAT TREATMENT OF CADMIUM MERCURY TELLURIDE AND PRODUCT

Harry H. Shimizu, Trail, Canada, assignor to Cominco Ltd., Trail, Canada

Filed Aug. 30, 1976, Ser. No. 718,636
Claims priority, application Canada, Jun. 11, 1976, 254698
Int. Cl.[2] C22F *1/02*
U.S. Cl. 148—20.3 **11 Claims**

1. A method for improving carrier lifetime of and reducing resistivity differences in n-type cadmium mercury telluride homogeneous single crystal material which includes subjecting single crystal cadmium mercury telluride represented by the formula $Cd_xHg_{1-x}Te$ wherein x has values in the range of 0.17 to 0.40 to heat treatment at a temperature in the range of 200° to 400° C. in the conjoint presence of tellurium and mercury and maintaining the temperature of the cadmium mercury

telluride in the range of from about 5° to about 40° C. above the temperatures of the tellurium and the mercury.

4,116,726

AS-CAST PERMANENT MAGNET SM-CO-CU MATERIAL WITH IRON, PRODUCED BY ANNEALING AND RAPID QUENCHING

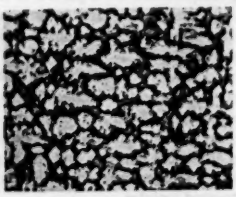
Anton Menth; Anthony J. Perry, both of Nussbaumen, and Ulrich Spinner, Aeugst, all of Switzerland, assignors to BBC Brown, Boveri & Company Limited, Baden, Switzerland

Division of Ser. No. 637,057, Dec. 2, 1975. This application Jun. 27, 1977, Ser. No. 810,673

Claims priority, application Switzerland, Dec. 18, 1974, 16878/74

Int. Cl.² H01F *1/08, 1/22, 7/02*

U.S. Cl. 148—31.57 **3 Claims**



1. A permanent-magnet material characterized by a matrix comprising statistically oriented, single crystal grains wherein each grain is an aligned permanent magnet and having the composition $Sm(Co_{1-x-y}Fe_xCu_y)_z$ wherein $0 < x < 0.2$, $0.1 < y < 0.3$ and $6.5 < z < 7.5$, prepared by a process comprising melting together said elements in amounts according to said composition, solidifying the melt by slowly cooling said melt, annealing the alloy of the melted-together elements at temperatures between 1150° and 1250° C, subsequently rapidly quenching said alloy, and further annealing said alloy at temperatures between 750° and 850° C.

4,116,727

MAGNETICAL SOFT ALLOYS WITH GOOD MECHANICAL PROPERTIES

Rodney Victor Major, Crawley, England, assignor to Telcon Metals Limited, Sussex, England

Continuation-in-part of Ser. No. 661,271, Feb. 25, 1976, abandoned. This application May 3, 1977, Ser. No. 793,246

Claims priority, application United Kingdom, Mar. 4, 1975, 8948/75

Int. Cl.² H01F *1/14;* C22C *38/08, 38/10*

U.S. Cl. 148—31.55 **11 Claims**

1. A soft magnetic alloy which after heat-treatment at a temperature in the range of 680°–750° C. has a coercive force not greater than 1.5 kA/m, a fine microstructure having ductility and strength characteristics that are relatively insensitive to the heat-treatment temperature within said range, the alloy consisting essentially of 2–8% nickel, 0.5–3% vanadium, 33–35% cobalt, 0–1% chromium, 0–1% manganese, 0–0.1% carbon, 0–0.5% silicon, 0–0.5% niobium, 0–0.3% zirconium and the balance iron apart from alloying ingredients and incidental impurities.

4,116,728

TREATMENT OF AMORPHOUS MAGNETIC ALLOYS TO PRODUCE A WIDE RANGE OF MAGNETIC PROPERTIES

Joseph J. Becker; Fred E. Luborsky; Israel S. Jacobs, and Richard O. McCary, all of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sep. 2, 1976, Ser. No. 719,914

Int. Cl.² C21D *1/04*

U.S. Cl. 148—108 **10 Claims**

1. A method for processing magnetic amorphous alloys to control the shape of the hysteresis loop of said alloys, said method comprising the steps of:

heating an amorphous magnetic alloy to a temperature sufficient to achieve stress relief but less than that required to initiate crystallization; and then

controllably cooling said alloy in the presence of a magnetic field, the rate of cooling being between approximately 0.1° C. per minute and approximately 100° C. per minute whereby magnetic amorphous alloys are usable in a greater variety of magnetic circuit applications.

4,116,729

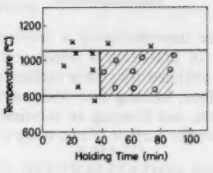
METHOD FOR TREATING CONTINUOUSLY CAST STEEL SLABS

Hiroshi Katoh; Yasumitsu Onoe, both of Kitakyushu; Osamu Akisue, and Kishio Mochinaga, both of Himeji, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Sep. 12, 1977, Ser. No. 832,577

Int. Cl.² B22D *11/00;* H01F *1/04*

U.S. Cl. 148—111 **5 Claims**



○ Having superior magnetic properties to those of the conventional materials

× Having inferior magnetic properties to those of the conventional materials

1. A method for treating a continuously cast steel slab obtained by continuously casting a molten steel containing 0.01 to 2.5% by weight of Al, which comprises holding the slab in a temperature range from the Ar_3 point to 650° C for at least 20 minutes when the temperature of said slab is first in said temperature range following said casting, to precipite nitrides, and hot rolling the slab.

4,116,730

SILICON-IRON PRODUCTION AND COMPOSITION AND PROCESS THEREFOR

Ronald H. Arendt, Schenectady, N.Y., and Patrick F. Aubourg, Arlington, Mass., assignors to General Electric Company, Schenectady, N.Y.

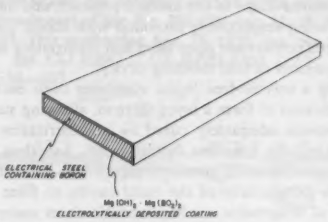
Filed Mar. 7, 1977, Ser. No. 774,808

Int. Cl.² H01F *1/04*

U.S. Cl. 106—113 **3 Claims**

1. The method of producing grain-oriented silicon-iron sheet which comprises the steps of providing a fine-grained, primary-recrystallized silicon-iron sheet containing 2.2 to 4.5 percent silicon, between about three and 50 parts per million boron, and between about 15 and 95 parts per million nitrogen in the ratio to boron of one to 15 parts per part of boron, electrolyzing an aqueous 0.05 to 1.0 molar solution of magnesium acetate containing magnesium metaborate and magnesia with the silicon-iron sheet being arranged as the cathode in said

solution and the said solution being at a temperature of at least about 65° C and thereby covering the sheet with an adherent electrically insulating 0.05 to 0.4 mil-thick coating of $Mg(OH)_2$ containing between about 10 and about 70 parts per million boron on the basis of the silicon-iron sheet, and subject-



ing the coated sheet to a final heat treatment at 950° to 1175° C in an atmosphere selected from the group consisting of hydrogen and a mixture of hydrogen and nitrogen to develop (110)[001] secondary recrystallization texture in the silicon-iron sheet.

4,116,731
HEAT TREATED AND AGED MAGNESIUM-BASE ALLOY

Nina Mikhailovna Tikhova, Frunzenskaya naberezhnaya, 38/1, kv. 394; Valentina Alexeevna Blokhina, 15 Parkovaya ulitsa, 42, korpus 3, kv. 25; Antonina Petrovna Antipova, Sheremetievskaya ulitsa, 71a, kv. 19, and Tamara Pavlovna Vasilieva, Izmailovsky bulvar, 46, kv. 5, all of Moscow, U.S.S.R.

Continuation-in-part of Ser. No. 718,872, Aug. 30, 1976, abandoned, which is a continuation of Ser. No. 515,024, Oct. 15, 1974, abandoned, which is a continuation of Ser. No. 340,749, Mar. 13, 1973, abandoned. This application Jul. 27, 1977, Ser. No. 819,566

Int. Cl.[2] **C22F** *1/06*

U.S. Cl. 148—161 **4 Claims**

1. A heat-treated and aged magnesium-based alloy, possessing heat-resistance and castability, suitable for manufacturing parts operating for a long time at temperatures up to 300° C and for a short period of time at 400° C, said alloy consisting essentially of, by weight: 0.8–6.0% yttrium, 0.5–4% neodymium, 0.1–2.2% zinc, 0.31–1.1% zirconium, up to 0.05% copper, up to 0.2% manganese and the balance being magnesium, provided that no less than 50% of the total amount of neodymium and yttrium additions enters the solid solution after heat treatment, the alloy having been heated at approximately 535° C for 4–8 hours, cooled in air and then aged at approximately 200° C for 12 hours.

4,116,732
METHOD OF MANUFACTURING A BURIED LOAD DEVICE IN AN INTEGRATED CIRCUIT

John S. Shier, 519 N. Castlerock Ter., Sunnyvale, Calif. 94087

Division of Ser. No. 724,851, Sep. 20, 1976, Pat. No. 4,064,527. This application Jan. 10, 1977, Ser. No. 757,961

Int. Cl.[2] **H01L** *21/76, 29/36*

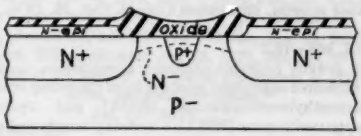
U.S. Cl. 148—175 **4 Claims**

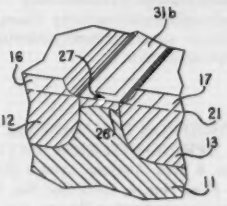
1. A process of forming an integrated circuit comprising the steps of

forming an elongated heavily doped region of first conductivity type in the upper surface of a lightly doped substrate of first conductivity type between at least first and second regions of second conductivity type disposed in the upper surface of said substrate, with at least one lateral opening of predetermined width through said elongated region,

depositing a lightly doped epitaxial layer of second conductivity type on the upper surface of said substrate over said regions, and

selectively oxidizing said epitaxial layer between said regions of second conductivity type to extend oxide at least into contact with said elongated region, said oxidation causing impurities to migrate from said epitaxial layer into the substrate surface, said impurities being sufficient to





convert the substrate region defined by said lateral opening to the second conductivity type, and thus form a channel of lightly doped second conductivity type through the lateral opening in said elongated region between said first and second regions.

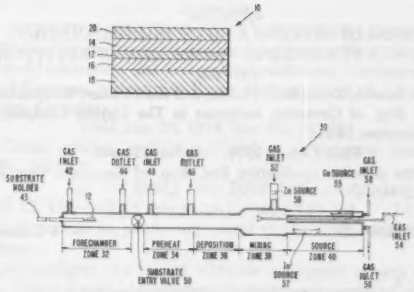
4,116,733
VAPOR PHASE GROWTH TECHNIQUE OF III-V COMPOUNDS UTILIZING A PREHEATING STEP

Gregory Hammond Olsen, Dayton, N.J.; Thomas Joseph Zamerowski, Yardley, and Charles Joseph Buiocchi, Levittown, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 6, 1977, Ser. No. 840,039

Int. Cl.[2] **H01L** *21/205 29/30; 29/38*

U.S. Cl. 148—175 **5 Claims**



1. In the method of fabricating a III-V semiconductor device wherein a semiconductor layer is vapor phase deposited onto a deposition body having a deposition surface and the deposition body is preheated prior to deposition, the improvement wherein the preheating step comprises:

preheating said deposition body to a temperature about 40° to 60° C. lower than the temperature of deposition for a predetermined period of time prior to raising the temperature of the body to the temperature of deposition.

4,116,734

COMPOSITE EXPLOSIVES

Guy Perrault, Ste-Foy; Raynald Francoeur, Nord, and Roger Lavertu, Ste-Foy, all of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Calif.X

Filed Oct. 7, 1977, Ser. No. 840,367
Claims priority, application Canada, Oct. 28, 1976, 264354
Int. Cl.[2] C06B 45/10
U.S. Cl. 149—19.2 9 Claims

1. A gravity pourable explosive composition, comprising a solid explosive ingredient selected from the group consisting of cyclotrimethylenetrinitramine (RDX) and cyclotetramethylenetetranitramine (HMX), a hydroxy-terminated polybutadiene based binder cured with a diisocyanate, and an organofunctional silane selected from the group consisting of gamma-methacryloxypropyltrimethoxy silane, beta-3,4-(epoxy-cyclohexyl)ethyltrimethoxy silane, gamma-glycidoxypropyltrimethoxy silane, trimethychlorosilane and N,O-bis-(trimethylsilyl)-acetamide.

4,116,735

METHOD FOR THE MANUFACTURE OF A SPRING-INTERIOR MATTRESS

Robert Plasse, 6 Blvd. Anatole, Lyon 6 (Rhone), France

Filed Nov. 4, 1976, Ser. No. 738,975
Claims priority, application France, Apr. 5, 1976, 76 13996
Int. Cl.[2] B68G 7/00; B32B 5/18, 31/12
U.S. Cl. 156—79 7 Claims

1. A method of manufacturing a mattress comprising two sheets of foam on either side of a metal framework comprising springs, the method comprising the following successive stages:

a sheet of pre-fabricated foam is placed such that its inner side is turned upwards and is substantially horizontal;

a strand of resin forming a foam-producing mixture is applied along the periphery of the inner side of this pre-fabricated sheet of foam;

the metal framework is placed on said sheet of foam;

the foam of the resin strand is allowed to form and expand freely, such that the latter at least partly surrounds the lower coil of the peripheral springs of the framework, in order to fix said framework to the sheet; and

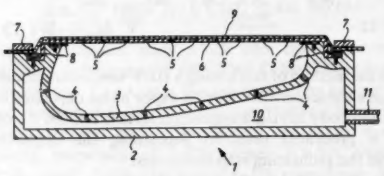
repeating the same operations with a second sheet of pre-fabricated foam and the same framework which is already integral with the first sheet of foam, after said framework has been turned over.

4,116,736

METHOD OF MAKING A FOAM PLASTIC CUSHION HAVING A PERIPHERAL FRAME AND AN EXTERIOR COVER

Joseph Sanson, Beaugency, France, and Kurt Moser, Kirchheim, Fed. Rep. of Germany, assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Oct. 1, 1976, Ser. No. 728,648
Claims priority, application Fed. Rep. of Germany, Oct. 6, 1975, 2544664
Int. Cl.[2] B29C 13/00; B29D 27/04
U.S. Cl. 156—79 6 Claims



1. In a method of forming a cushion or similar product comprising a resilient elastomeric foam and a sheet material facing enclosing said foam and integrally secured thereto, the steps which comprise:

providing complementary partible members of a mold wherein said members have molding surfaces defining in the closed condition of said mold a cavity configured to the desired shape of the finished product, said mold members being respectively provided with elastic membranes secured across their open faces and confronting said molding surfaces of said molding cavity;

spraying a solvent-free liquid elastomer onto each of said membranes to form a layer thereon, allowing such layers to become adequately cured by polymerization to form mechanically coherent facing sheets, and then bringing said partible mold members together to join said facing sheets peripherally of the mold cavity to form a closed sack of deformable, air-impermeable sheet material;

applying differential pressure to said mold to stretch said elastic membranes and said facing sheets formed thereon into conformity with said mold cavity;

introducing into said sack while thus conformed a self-foaming liquid polymer mix and allowing said mix to develop and fill said sack with resilient foam;

holding said foam-filled sack in said mold until said foam is sufficiently jelled and said sack walls are secured thereto; and

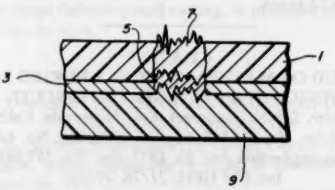
parting said mold members and removing said foam-filled product in desired configuration completely encased in said sheet material facing.

4,116,737

METHOD OF CREATING AN EMBOSSING EFFECT

Alvar A. Svens, 112 Main St., Ashburnham, Mass. 01430

Continuation of Ser. No. 523,326, Nov. 13, 1974, abandoned.
This application May 4, 1976, Ser. No. 683,236
Int. Cl.[2] B29C 27/00
U.S. Cl. 156—85 6 Claims



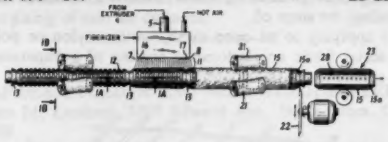
1. A method of creating an embossed effect in a desired pattern on a film, said film being constructed of a material which can have its heat resistance to wrinkle lowered by application of an attacking agent thereto, comprising the steps of impregnating selected areas of said film with said attacking agent thereby lowering the heat resistance to wrinkle of said selected film areas, laminating said film to a substrate heated to a temperature greater then 250° F., said heated substrate causing said selected areas of said film to wrinkle and distort, and thereby creating an embossed effect on said film.

4,116,738

CONTINUOUS PRODUCTION OF TUBULAR MODULAR FILTER ELEMENTS USING NONWOVEN WEBS FROM THERMOPLASTIC FIBERS AND PRODUCTS

David B. Pall, Roslyn Estates, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

Division of Ser. No. 649,001, Jan. 14, 1976, which is a continuation-in-part of Ser. No. 393,688, Aug. 31, 1973, Pat. No. 3,933,557. This application Apr. 25, 1977, Ser. No. 792,084
Int. Cl.[2] B29C *27/28;* B29D *9/00, 73/04*
U.S. Cl. 156—167 20 Claims



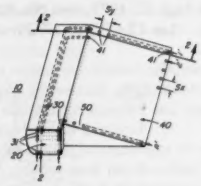
1. A process for continuously forming modular tubular filter elements of thermoplastic fibrous material, said elements having a seamless, generally cylindrical configuration and having a foraminous tubular support and a desired length, comprising: spinning a plurality of fibers from molten thermoplastic material, collecting and winding said fibers directly onto an axially moving, rotating foraminous tubular core to form thereon a wound cylindrical layer of randomly oriented heterogeneously interwined spun fibers, said layer being of indefinite length, cutting through said layer, and detatching a severed length of filter tube and a length of core together from said indefinite length thereby forming said tubular filter element having said tubular support.

4,116,739

METHOD OF FORMING AN OPTICAL FIBER DEVICE

William E. Glenn, Ft. Lauderdale, Fla., assignor to New York Institute of Technology, Old Westbury, N.Y.

Filed Nov. 26, 1976, Ser. No. 745,187
Int. Cl.[2] B65H *81/00;* G02B *5/14*
U.S. Cl. 156—169 14 Claims



1. A method of making an optical display apparatus, comprising the steps of:

(a) wrapping a plurality of optically conducting elongated strands in a substantially parallel configuration about a spacer element;

(b) positioning at least one additional spacer element over the previously wrapped strands and rewrapping said plurality of strands over said at least one additional spacer element in spiral fashion;

(c) repeating step (b) a desired number of times;

(d) severing the spirally wound construction substantially along the plane of said first-mentioned spacer element; and

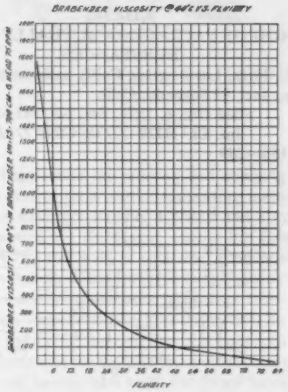
(e) angularly severing a resultant portion of the construction to form a pair of wedge-shaped display apparatuses.

4,116,740

WATER RESISTANT CORRUGATING ADHESIVE COMPOSITION

Camillus B. Musselman, Chesterfield, and Edward M. Bovier, St. Louis County, both of Mo., assignors to Anheuser-Busch, Incorporated, St. Louis, Mo.

Division of Ser. No. 477,325, Jun. 7, 1974, Pat. No. 3,912,530, which is a continuation-in-part of Ser. No. 264,868, Jun. 21, 1972, abandoned, and Ser. No. 371,040, Jun. 18, 1973, abandoned. This application Jul. 18, 1975, Ser. No. 597,395
The portion of the term of this patent subsequent to Mar. 29, 1994, has been disclaimed.
Int. Cl.[2] B31F *1/22*
U.S. Cl. 156—205 7 Claims



1. A method of making multiwall thickness corrugated board at high speeds comprising the steps of

(a) preparing a water resistant adhesive mix having a gelatinized modified waxy starch in the carrier portion and raw starch as a bonding agent, said modified waxy starch having an alkali fluidity of 25 to about 90 mls at 25° C measured with a 5 gram sample,

(b) applying said mix to a corrugator, and

(c) forming a multiwall board on said corrugator at a higher than normal rate of speed.

4,116,741

TEXTILE COATING WITH POLYURETHANES

Wilhelm Thoma, Bergisch-Neukirchen; Jochen Wulff, Dusseldorf-Holthausen, and Georg Niederdellmann, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 20, 1975, Ser. No. 542,734
Claims priority, application Fed. Rep. of Germany, Jan. 22, 1974, 2402799
Int. Cl.[2] D06Q *1/00;* B32B *5/02, 27/40*
U.S. Cl. 156—239 1 Claim

1. A process for producing coated textile sheets which comprises:

(A) applying to a release substrate an organic solvent solution top coat of a substantially linear polyurethane which is substantially free of reactive end groups prepared by a process comprising reacting,

i. an organic dihydroxy compound of molecular weight 500 to 4,000 and

ii. a mixture of at least two organic diols of molecular weight 62 to 450 with at least two of which diols are present in a quantity of more than 5 mol %, and

iii. an aromatic diisocyanate, using a molecular ratio between components i) and ii) of 1:1 to 1:5 and an NCO-/OH ratio of 0.95: 1.05,

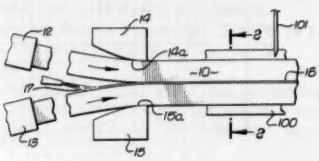
(B) evaporating sufficient solvent to leave a substantially dried top coat on said substrate,
(C) applying a polyurethane bonding coat solution to said top coat characterized in that said polyurethane bonding coat solution contains at most 25% by weight, based on the total quantity of solvent, of dimethylformamide,
(D) applying said textile sheet to be coated to said release substrate whereby said top coat and said bonding coat are therebetween,
(E) substantially evaporating the solvent from said bonding coat and,
(F) separating the resulting coated textile from said release substrate.

4,116,742

METHOD OF PACKAGING MUTUALLY REACTIVE SUBSTANCES

Francis G. Firth, Los Angeles, Calif., assignor to Applied Plastics Co., Inc., El Segundo, Calif.

Filed Dec. 6, 1976, Ser. No. 747,612
Int. Cl.[2] B32B *27/38;* C09J *7/02*
U.S. Cl. 156—289 **4 Claims**



1. The method of packaging kneadable plastic masses that react when mixed, that includes
(a) providing first and second mutually reactive plastic masses which are kneadable together,
(b) interposing a thin, flexible barrier between and adjacent said masses to block contact of the masses until such time as they are intentionally kneaded together for reaction,
(c) and providing a common support for said masses, and engaging the masses with said support,
(d) said barrier being interposed by coating a liquid barrier film on that portion of at least one of the masses which is closest to and being relatively displaced toward the other mass, the film consisting essentially of a film former dissolved in a solvent, and
(e) evaporating said solvent to deposit the film former directly on adjacent portions of the masses, the former characterized as essentially impermeable to reactive ingredients in said masses.

4,116,743

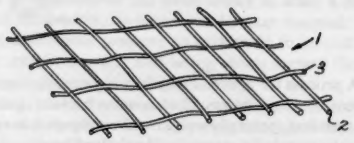
NYLON OR POLYESTER SLIP SET FABRIC CHEMICALLY TREATED TO ADHERE NEOPRENE, EPDM OR BUTYL FILM

Delbert A. Davis, Kernersville, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed Apr. 26, 1977, Ser. No. 790,872
Int. Cl.[2] C09J *5/06*
U.S. Cl. 156—333 **2 Claims**

1. A process of bonding a woven fabric to a rubber substrate including the steps of:
(1) applying to an open mesh, woven nylon or polyester scrim fabric an elastomeric coating of a dispersion of a carboxylated chloroprene latex
said latex consisting essentially of chloroprene, as the primary monomer, with from about 2 to about 5% by weight of methacrylic acid as comonomer, and having a carboxyl functionality of about 0.033/100 grams of latex solids;
(2) drying the elastomeric coating applied in step (1) thereby mechanically securing the warp and fill yarns of said fabric together at their cross over points and preventing substantial movement or distortion of the individual yarns or thread members of said fabric; and thereafter
(3) contacting at least one planar surface of the coated fabric of step (2) with a rubber substrate to form a ply; and
(4) curing the fabric/rubber ply of step (3) under rubber-curing conditions to cure the rubber and to form chemical bonds between said fabric and the coating elastomer thereon.

2. A process of bonding a woven fabric to a rubber substrate including the steps of:
(1) applying to an open mesh, woven nylon or polyester scrim fabric an elastomeric coating of a dispersion of a carboxylated chloroprene latex copolymer



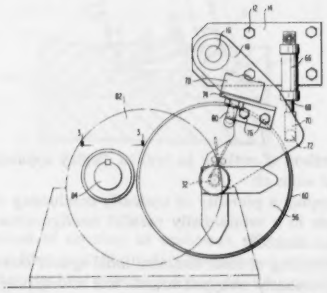
said latex consisting essentially of chloroprene, as the primary monomer, with from about 2 to about 5% by weight of methacrylic acid as comonomer, having a carbonyl functionality of about 0.033/100 grams of latex solids and a chlorine content of about 36% by weight;
(2) drying the elastomeric coating applied in step (1) thereby mechanically securing the warp and fill yarns of said fabric together at their cross over points and preventing substantial movement or distortion of the individual yarns or thread members of said fabric, and thereafter
(3) contacting at least one planar surface of the coated fabric of step (2) with a rubber substrate to form a ply; and
(4) curing the fabric/rubber ply of step (3) under rubber-curing conditions to cure the rubber and form chemical bonds between said fabric and the coating elastomer thereon.

4,116,744

CONTROL APPARATUS FOR A TIRE BUILDING MACHINE

Raymond L. Currie, Findlay, Ohio, assignor to Cooper Tire & Rubber Company, Findlay, Ohio

Filed Aug. 22, 1977, Ser. No. 826,692
Int. Cl.[2] B29H *17/20*
U.S. Cl. 156—352 **5 Claims**



1. A control apparatus for a tire building machine having a rotatably driven tire building drum with a gear train mechanism therefore positioned within a housing from which a rotatable drive shaft projects, a base plate, a rod connected to said base plate, a pair of spaced depending plate members pivotally

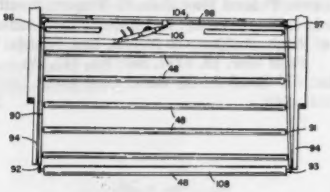
mounted on said rod, a shaft rotatably supported in said plate members, a wheel secured to said shaft, a pair of cam arms adjustably mounted on said shaft, switch members mounted on one of said plate members and connected to said tire building drum for controlling the rotation thereof, a wheel secured to said rotatable drive shaft, an air cylinder carried by said base plate and connected to said plate members, means for energizing said air cylinder to move said plate members and wheel into engagement with said drive shaft wheel for rotating said cam arms into engagement with said switch members to terminate the rotative movement of the tire building drum and the de-energizing of said air cylinder.

4,116,745

LAP SEAM FOLDER AND WIDE WIDTH SEALER

Everette M. Lambert, 3380 Edward Ave., Santa Clara, Calif. 95050

Division of Ser. No. 570,308, Apr. 21, 1975, Pat. No. 4,036,678. This application Apr. 20, 1977, Ser. No. 789,035
Int. Cl.[2] B65C *9/40*
U.S. Cl. 156—362 **2 Claims**



1. An apparatus for dispensing first and second relatively wide pieces of material onto a bed so that the pieces of material can be heat sealed together, the first piece of material at times comprising multiple connected and folded widths of said material disposed upstream of said dispensing apparatus, said dispensing apparatus comprising:

a support structure located at one end of the bed;

a pair of spaced frame members each having one end pivotally connected to the support structure and an opposite free end, the connected ends of said frame members being juxtaposed to that said frame members remain parallel when the free ends thereof are moved in concert, said frame members being disposed generally horizontal;

a plurality of first rollers spanning said frame members and rotatably attached thereto, said first rollers being adapted to receive thereover said first piece of material and to dispense it onto the bed;

a pair of second rollers positioned relatively horizontally to one another and above said support structure, said second rollers being adapted to support and underlie a free-turning web of said second material;

a plurality of third rollers intermediate of said second rollers and said first rollers, said third rollers being adapted to dispense said second piece of material from said web to overlie said first piece of material feeding onto said bed;

means for sensing the lateral position to the first piece of material on the bed to detect lateral misalignment of said first piece of material;

means for motivating the free ends of the spaced frame members from side to side in concert responsive to said sensing means to correspondingly divert the dispensed first piece of material to re-align the material on te bed;

a guide roller pivotally connected at the upstream end of said space frame members and adjacent the ends of said frame members which are pivotally connected to said support structure; and

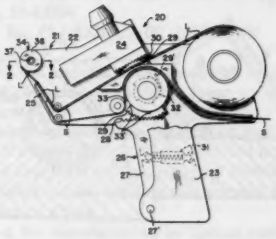
linkage means between the ends of said guide roller and each of said frame members, said linkage means being adapted for vertically translating one or the other of the ends of said guide roller for re-aligning said first piece of material.

4,116,746

HAND-HELD LABELER

Paul H. Hamisch, Jr., Franklin, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Mar. 7, 1977, Ser. No. 775,010
Int. Cl.[2] B32B *35/00*
U.S. Cl. 156—384 **17 Claims**



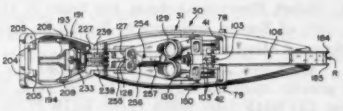
1. Hand-held apparatus for printing and applying pressure sensitive labels carried on a web of supporting material, comprising: a frame having a handle, a platen and a cooperable print head mounted by the frame, means for delaminating printed labels from the web, a rotatable applicator roll for applying printed labels, means for advancing the web about the delaminating means to dispense a label into label applying relationship with respect to the applicator roll, an actuator disposed at the handle for moving the print head into cooperation with the platen and for moving the web advancing means, the applicator roll having stub ends, the frame having spaced apart sockets, wherein each stub end is received in a respective socket, the sockets being oversize relative to the respective stub ends to provide a loose fit so that the applicator roll will cant and accommodate the surface to which the label is to be applied.

4,116,747

HAND-HELD LABELER

Paul H. Hamisch, Jr., Franklin, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Apr. 25, 1977, Ser. No. 790,519
Int. Cl.[2] B32B *31/00*
U.S. Cl. 156—384 **37 Claims**



1. Hand-held apparatus for printing and applying pressure sensitive labels releasably secured to a web of supporting material, comprising: a body having a handle, a manually operable actuator disposed at the handle, a platen, a print head cooperable with the platen for printing on successive labels, means responsive to movement of the actuator for moving the print head into printing cooperation with the platen and for advancing the web, a shaft mounted by the body, an applicator mounted on the shaft, the body having a body section pivotally mounted on the shaft and movable between open and closed positions, an inker for the print head disposed in the space within the body, and means for releasably latching the body section to the body in the closed position.

4,116,748

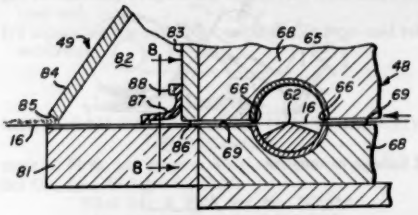
DRY WALL TAPING MACHINE HAVING AN IMPROVED TAPE SHEAR

Harold M. Lass, San Jose, Calif., assignor to Corban Industries, Inc., San Jose, Calif.

Continuation-in-part of Ser. No. 739,520, Nov. 8, 1976, abandoned. This application May 2, 1977, Ser. No. 793,081

Int. Cl.[2] **B32B** *31/00;* **B44C** *7/00;* **B26D** *1/00, 5/08*

U.S. Cl. 156—526 **9 Claims**



1. In a dry wall taping machine for applying tape to elongated seams between adjacent sections of dry wall:

main body means to be grasped by the operator for movement along the seam by the operator and having an application portion for applying tape from a supply over the seam to be taped;

mud box means carried from said main body means to be supplied with mud under pressure for applying mud to that surface of the tape which is to face the wall being taped and having a tape entrance opening therein through which the tape is fed into said mud box means;

tape shear means disposed at a station up-tape from said mud box means for shearing the tape at the end of the seam, said tape shearing means including a rotary shear structure having first and second shearing members disposed for passage of the tape therethrough, said first shearing member having a cutting edge portion formed thereon and said second shearing member being rotatable relative to said first shearing member for shearing of the tape therebetween, said rotatable shearing members being disposed such that the axis of revolution of said rotatable member extends laterally of the longitudinal axis of the tape passing through said tape shearing means; and

sealing means disposed down-tape from said shearing means for preventing travel of mud along the tape in the up-tape direction from said mud box means into said tape shearing means.

4,116,749

APPARATUS FOR THE APPLICATION OF POLYMER FILMS ON A SUPPORT

Jacques L. Dufort, Fleury-les-Aubrais, and Roger R. Hermelin, Olivet, both of France, assignors to Bureau de Recherches Geologiques et Minieres, Paris, France

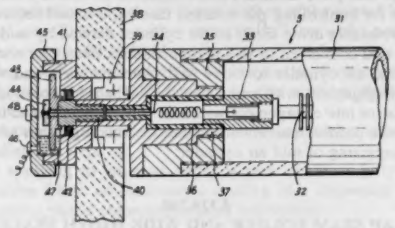
Filed Dec. 22, 1976, Ser. No. 753,381

Claims priority, application France, Dec. 24, 1975, 75 39775

Int. Cl.[2] **B31F** *5/00;* **B30B** *15/34;* **B21B** *27/06*

U.S. Cl. 156—555 **1 Claim**

1. An apparatus for applying a polymer film onto a support as the film and support move between a heating roller and a pressure roller journalled for rotation in a supporting frame, said heating roller comprising a hollow elongated cylinder, a heating element extending coaxially within said cylinder in uniform spaced relation relative to the interior of said hollow cylinder, support means for supporting one end of said heating element in said hollow cylinder and for rotatably supporting said cylinder in said supporting frame to allow for axial thermal expansion and contracting of said heating element and cylinder, first electrical contact means comprising a disc coaxially connected to said cylinder for axial movement therewith and a second electrical contact means comprised of a mercury bath means into which said disc extends secured to said supporting frame and adapted to be connected to a source of electrical power, said first and second contact means being



disposed in movable contact with each other for relative movement in the axial direction of said heating roller without breaking contact.

4,116,750

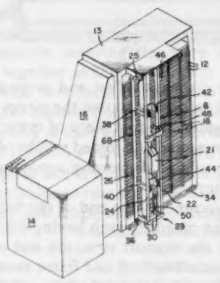
SHEET BINDING APPARATUS

Barry J. Lewis, Federal Way; John C. Kuspert, Seattle; Arthur G. Saunders, Maple Valley, and Robert R. McAusland, Seattle, all of Wash., assignors to Norfin, Inc., Seattle, Wash.

Filed Mar. 15, 1977, Ser. No. 777,730

Int. Cl.[2] **B32B** *31/00;* **B05C** *1/00;* **B42B** *1/02*

U.S. Cl. 156—563 **21 Claims**



1. Sheet binding apparatus, comprising: means for assembling sheets into individual groups within respective sheet holding compartments with the sheets having at least one of their edges aligned in a single plane; adhesive binding means including an adhesive application member and heat application means for applying adhesive to bind the sheets in at least one of said groups at a location along the length of the coplanar edges thereof; hold down means operatively associated with said binding means and said compartments for holding the sheets of said one group stationary to maintain copolar edge alignment thereof during binding; and means for controlling heat transfer between said adhesive application member and said heat application means by selectively positioning said adhesive application member with respect to said heat application means.

4,116,751

METHODS AND APPARATUS FOR PRODUCING UNSUPPORTED MONOCRYSTALLINE FILMS OF SILICON AND OF OTHER MATERIALS

Solomon Zaromb, 171 Clifton Ave., Newark, N.J. 07104

Filed Oct. 8, 1975, Ser. No. 620,650

Int. Cl. B01j *17/30, 17/32*

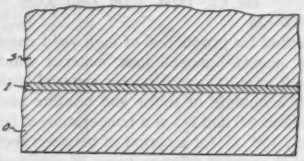
U.S. Cl. 156—600 **3 Claims**

1. A method of producing unsupported monocrystalline films which comprises:

(a) providing at least one reusable monocrystalline substrate

S having a crystal structure closely matching that of the desired films;

(b) epitaxially depositing on the lower surface of substrate S first an intermediate monocrystalline layer I and next an outer monocrystalline layer O so as to form a three-layer S-I-O configuration, said three layers having closely matching crystal structures;



(c) reducing the ambient pressure below the vapor pressure of at least one component of said intermediate layer I, or raising the temperature of said intermediate layer so as to raise the vapor pressure of at least one of its components above the ambient pressure, thereby blowing off said outer layer O and causing it to fall by gravity onto a supporting base; and

(d) recycling substrate S.

4,116,752

PRODUCTION OF SINGLE CRYSTALLINE FERRITE PARTICLES

Seiji Matsumoto, and Kiyoshi Fukai, both of Sakai, Japan, assignors to Sakai Chemical Industry Co., Ltd., Sakai, Japan

Filed May 23, 1974, Ser. No. 472,740

Claims priority, application Japan, Mar. 1, 1974, 49-23938

Int. Cl.[2] B01J *17/06;* **C01G** *49/02;* **C01F** *11/00*

U.S. Cl. 156—624 **13 Claims**

1. A method for producing single crystal strontium ferrite or barium ferrite particles in the form of hexagonal plates about 0.5μ to 2.0μ in diameter and less than about one-fourth of said diameter in thickness, which comprises:

(a) reacting an admixture of

(i) about 4.3 to 6.5 moles, expressed as ferric oxide, of an iron compound selected from the group consisting of ferric hydroxide, ferric oxyhydroxide, calcined porous ferric oxide and ferric oxide having a particle size less than about 0.8μ;

(ii) about one mole, expressed as metal oxide, of at least one metal compound selected from the group consisting of the oxides, hydroxides, carbonates and carboxylates of strontium and barium; and

(iii) about 0.05–2 moles of a metal chloride flux selected from the group consisting of strontium chloride, barium chloride and mixtures thereof,

at a temperature between the melting point of said metal chloride flux and 1300° C. to form said strontium ferrite or barium ferrite particles having the stoichiometric composition MO·6 Fe_2O_3 wherein M is divalent strontium or barium;

(b) cooling the resultant reaction mixture to form a cake comprising said single crystal ferrite particles and water soluble flux intervened therebetween; and

(c) extracting said water-soluble flux from said particles.

4,116,753

METHOD FOR THE MANUFACTURE OF OPTICAL MOLD FOR REPRODUCING CURVED SURFACES HAVING THE SAME SHAPE AS AN OPTICAL PROTOTYPE

Tsutomu Tojyo, and Shozo Sato, both of Hachiouji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jun. 7, 1977, Ser. No. 804,242

Claims priority, application Japan, Jun. 14, 1976, 51-69593; Jun. 14, 1976, 51-69594

Int. Cl.[2] B32B *17/00, 7/12, 15/00*

U.S. Cl. 156—629 **4 Claims**

1. A method for manufacturing an optical mold for reproducing optical curved surfaces in the shape corresponding to that of an optical prototype comprising: forming a first layer of a metal on an optical prototype, forming on said first layer a second layer of a metal different from said first layer of metal, dissolving said first layer for releasing said second layer from said optical prototype and bonding said released second layer onto the surface of a base.

3. A method for manufacturing an optical mold for reproducing optical curved surfaces in the shape corresponding to that of an optical prototype comprising: forming a first layer of metal on the surface of an optical prototype, forming on said first layer a second layer of metal different from said first layer of metal, bonding a base onto said second layer of metal with a bonding agent interposed therebetween, and dissolving said first layer of metal for releasing said second layer of metal from said optical prototype.

4,116,754

METHOD OF FORMING MATT DISPLAY ELECTRODE

Frank Alfred Huntley, Porchester, and William Morris Morgan, Chandler's Ford, both of England, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 7, 1977, Ser. No. 831,218

Claims priority, application United Kingdom, Sep. 30, 1976, 40575/76

Int. Cl.[2] C23F *1/00*

U.S. Cl. 156—656 **9 Claims**

1. A method of improving the optical contrast between energized and unenergized display electrodes used in an electrically driven display device of the kind in which display electrodes are normally visible but are obscured when energized, the method comprising a chemical treatment including steps of;

(a) of subjecting at least the visible surfaces of aluminum electrodes to the action of a solution which combines with the material of the electrode to form a compound insoluble in the solution, said mixture being an aqueous solution of a mixture of chromium trioxide, nitric acid, and sulfuric acids; and

(b) subjecting the compound to the action of a second solution, said solution dissolves only the compound, comprising buffered hydrofluoric acid and a reducing agent thereby roughening the surface of the electrodes and providing a matt appearance.

4,116,755

CHEM-MILLING OF TITANIUM AND REFRACTORY METALS

Dolphus L. Coggins, St. Louis, and John Gumbelevicius, Creve Coeur, both of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Sep. 6, 1977, Ser. No. 830,565

Int. Cl.[2] C23F *1/02*

U.S. Cl. 156—659 **13 Claims**

1. A method of chemically milling and surface treating a material selected from the group consisting of titanium, columbium, molybdenum, tungsten, tantalum, and their alloys without excessive hydrogen absorption comprising the steps of:

(a) exposing said material to a solution containing per liter of

solution about 126 to about 700 g pure nitric acid equivalent, an amount of fluoride producing material sufficient to provide the equivalent of about 8.8 to about 176.1 of pure hydrofluoric acid, at least 10 grams of a derivative of carbonic acid, at least about 1.5 gm monocarboxylic acid derivative containing alkali metal ions,

(b) at a temperature of about 0°–110° C,

(c) for a period of time sufficient to remove the undesired material.

4,116,756

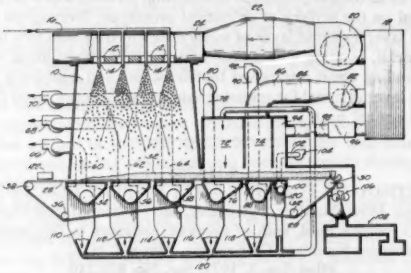
SPRAY DRYING ON WOVEN BELT OF MONOFILAMENT SYNTHETIC FIBER

Jack A. Quee, Fond du Lac, Wis., assignor to Dec International, Inc., Madison, Wis.

Continuation of Ser. No. 579,902, May 22, 1975, abandoned. This application Feb. 16, 1977, Ser. No. 769,143

Int. Cl.[2] B01D *1/00*

U.S. Cl. 159—45 **9 Claims**



1. A spray drying apparatus comprising the combination:

an enclosed primary stage spray chamber having an outlet at the lower end thereof; at least one hot gas inlet port in the upper portion thereof and a source of drying gas communicating therewith;

at least one spray nozzle extending into the spray chamber; a draft producing means connected to communicate with the chamber for forcing the drying gas from the gas source through the chamber and out through the outlet thereof; an endless collecting belt supported for horizontal movement at the chamber outlet, said belt being in the form of a double layer woven fabric comprised of two layers of weft threads with a plurality of warp threads interconnecting said two layers, the material of said weft and warp threads being monofilament synthetic fiber; and drive means for advancing said belt.

4,116,757

SOLAR EVAPORATION OF ALKALINE TRONA-PROCESS WASTE POND LIQUORS WITH ACID BLACK 2 AND ACID GREEN 1

Norman R. Garofano, Syracuse, N.Y., and Ronald G. Bitney, Rock Springs, Wyo., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 18, 1976, Ser. No. 742,821

Int. Cl.[2] B01D *1/00*

U.S. Cl. 159—47 WL **4 Claims**

1. A process for increasing the rate of solar evaporation of water from an alkaline trona-process waste liquor which comprises introducing to the waste liquor an effective amount of a dye selected from the group consisting of Acid Black 2, and Acid Green 1, and subjecting the resulting mixture to solar radiation for evaporation of water therefrom.

4,116,758

METHOD OF PRODUCING HIGH YIELD CHEMIMECHANICAL PULPS

Michael J. Ford, West Hawkesbury, and Prescott Elliott Gardner, Vankleek Hill, both of Canada, assignors to Canadian International Paper Co., Montreal, Canada

Continuation of Ser. No. 687,454, May 18, 1976, abandoned. This application Oct. 3, 1977, Ser. No. 838,837

Claims priority, application Canada, May 14, 1976, 252642

Int. Cl.[2] D21C *3/06, 3/12, 3/26*

U.S. Cl. 162—28 **11 Claims**

1. A method for production of high yield chemimechanical pulp from woody lignocellulosic material which comprises treating said woody lignocellulosic material with an aqueous solution of a mixture of sulfite and bisulfite having a pH of between about 6.0 and 8.5 at a temperature of between about 100° C. and 150° C. for a period of between about 10 and 90 minutes, said aqueous solution being of sufficient strength to sulfonate said woody lignocellulosic material to at least about 85% of the maximum level of sulfonation that can be achieved on said woody lignocellulosic material without reducing the yield of pulp below about 90% by weight, and subsequently subjecting the resulting sulfonated material to mechanical defibration.

4,116,759

PREPARATION OF LIQUOR FOR DELIGNIFICATION OR ALKALI TREATMENT BY AUTOCAUSTIZATION, AND THE PREPARATION OF PULP WITH THIS LIQUOR

Jan Janson, Granbackagranden 3B22, 02210 Espoo 21, Finland

Filed Aug. 31, 1976, Ser. No. 719,139

Claims priority, application Finland, Sep. 2, 1975, 752463

Int. Cl.[2] D21C *11/12*

U.S. Cl. 162—32 **8 Claims**

1. A method for the alkali pulping of ligno-cellulose materials, comprising the steps of cooking the ligno-cellulose material in an alkaline aqueous cooking liquor containing as an active ingredient at least one alkaline salt of a polybasic inorganic acid selected from the group consisting of NaH_2BO_3 and Na_2HBO_3, combusting the residual cooking liquor to obtain an alkaline inorganic substance, and dissolving said inorganic substance in water to provide the same alkaline salt as used in the cooking step.

5. A method for the alkaline bleaching of pulp derived from ligno-cellulose materials, the steps comprising bleaching the pulp in the presence of oxygen in an aqueous alkaline liquor containing as an active ingredient at least one alkaline salt of a polybasic inorganic acid selected from the group consisting of Na_2HBO_3 and NaH_2BO_3, combusting the residual liquor to obtain an alkaline inorganic substance, and dissolving the inorganic substance in water to form the same alkaline salt used in the bleaching step.

4,116,760

METHOD AND APPARATUS FOR REMOVING LIQUID FROM A SLURRY OF SOLID MATERIAL

Richard B. Kennedy, Ridgefield, Conn., assignor to General Recycling Corporation, Clayton, Mo.

Continuation-in-part of Ser. No. 694,099, Jun. 8, 1976, abandoned. This application Jun. 11, 1976, Ser. No. 694,920

Int. Cl.[2] B30B *9/20, 15/00, 15/30*

U.S. Cl. 162—56 **45 Claims**

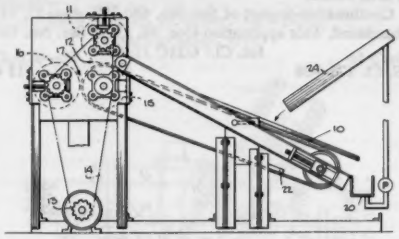
1. A method of removing liquid from a slurry of solid material in liquid, comprising the steps of:

conveying said slurry to a roll nip in an inclined plane by an inclined conveyor means,

squeezing liquid from said slurry by passing said slurry through said roll nip,

simultaneously with said step of squeezing and passing, blocking liquid squeezed from said slurry from flowing through said roll nip, and

simultaneously with said steps of squeezing and blocking, removing liquid squeezed from said slurry from said roll nip by guiding liquid squeezed from said slurry away from said roll nip in said inclined plane at selected intervals



along the length of said nip by a plurality of liquid guide means, disposed in spaced-apart parallel relationship, parallel to said inclined plane, and each having one end thereof disposed at and opening adjacent to said roll nip.

4,116,761
POROUS ELEMENT AND THE PREPARATION THEREOF

Brian Arthur Head, Maidstone, England, assignor to Whatman Reeve Angel Limited, Maidstone, England

Continuation of Ser. No. 664,501, Mar. 8, 1976, abandoned, which is a continuation-in-part of Ser. No. 523,587, Nov. 14, 1974, Pat. No. 3,972,694, which is a continuation-in-part of Ser. No. 509,204, Sep. 25, 1974, abandoned. This application Jan. 13, 1978, Ser. No. 869,053

Int. Cl.[2] D21F *11/00*

U.S. Cl. 162—152 **30 Claims**

1. A method of making a tubular element of uniform density and porosity which method comprises:

a. uniformly depositing onto the surface of a cylindrical porous mold from an aqueous dispersion of crushable fibres coated with a bonding agent, a tubular mat of the coated crushable fibres, the fibres of the aqueous dispersion consisting essentially of and selected from the group of polycrystalline fibres comprising alumina fibres, zirconia fibres, aluminum silicate fibres, and potassium polytitanate fibres which fibres have a diameter of from about 0.001 to about 10 microns, the mold substantially uniformly covered with drainage holes for the removal of excess water from the dispersion and having accurately circular and concentric circumferential collars of defined width at each end of the mold containing the drainage holes, the deposited tubular mat on the mold having a defined thickness which exceeds the width of said collars; and

b. compressing the tubular mat of fibres while on said mold by rolling the mold on the said collars across a surface with sufficient pressure to reduce the width of the tubular mat to the width of the circumferential collars to crush and rearrange the fibres and provide a mat of essentially uniform density and porosity and with a substantially smooth external surface; and

c. drying the resultant tubular mat of bonded and crushed fibres.

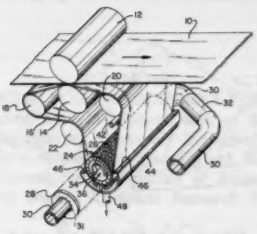
4,116,762
POROUS FELT WEB CONDITIONING SYSTEM

Frank J. Gardiner, 3 Ledge Rd., Cumberland Foreside, Me. 04011

Filed Jan. 28, 1977, Ser. No. 763,654

Int. Cl.[2] B08B *5/00, 7/04;* D21F *1/32*

U.S. Cl. 162—199 **26 Claims**



1. Apparatus for removing foreign matter from a porous, absorbent felt web, comprising:

a rotatably disposed roll closed at its extremes, said roll including a foraminous cylindrical shell having an axial dimension at least equal to the width of said web;

means for feeding said web at a selected speed under tension around said roll, said feeding means and said roll being positioned with respect to each other to provide an unsupported path portion therebetween for said tensioned web, said web being positioned to move jointly with said roll in contact therewith through a wrap angle of at least 90°;

means for introducing a gas under positive pressure directly to the interior of said roll; and

means for limiting the application of said pressurized gas to a positionally constant portion of said rotating shell, said shell portion extending axially substantially the full length of said roll and subtending an angle with the axis of said roll encompassed by said wrap angle.

22. Method of removing foreign matter from a moving porous absorbent felt web, said method comprising the steps of

moving said web under tension in contact with a rotatable, substantially cylindrical foraminous surface, said web moving jointly with said surface at a selected speed through a wrap angle of at least 90° of a circular path, and

applying a gas at a positive pressure to the concave side of said surface throughout the angle bracketed by said wrap angle, to pass through said durface and said web;

said speed and said gas pressure being selected with respect to the radius of said surface so that the combined action of said gas passing through said web and the centrifugal force created by the speed of said web moving in contact with said surface, tends to expel foreign matter from successive portions of said web passing through said bracketed angle.

4,116,763
SEPARATING SYSTEM FOR WIRES OF A DOUBLE-WIRE PAPER-MAKING MACHINE

Wolf-Gunter Stotz, and Herbert Holik, both of Ravensburg, Germany, assignors to Escher Wyss GmbH, Ravensburg, Wurtt., Germany

Filed Jan. 6, 1977, Ser. No. 757,139

Claims priority, application Switzerland, Jan. 19, 1976, 565/76

Int. Cl.[2] D21F *1/40*

U.S. Cl. 162—301 **13 Claims**

1. A double wire paper-making machine comprising

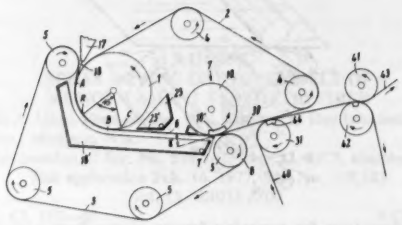
a rotatable directing roll;

a pair of forming wires of endless loop construction extending along a periphery of said roll from a place of engagement to a place of dis-engagement, said place of disengagement being disposed between the lowest point of said

roll and a point offset by 45° from said lowest point in a direction towards said place of engagement;

a plurality of guide rolls guiding said wires in respective endless paths, one of said wires being guided around much of said directing roll and both said wires being guided in a straight path downstream of said dis-engagement place;

a head box upstream of said directing roll for supplying stock between said wires to form a paper web therebetween;



a separator downstream of said directing roll for separating said wires from each other with the paper web on the bottom of said one wire; and

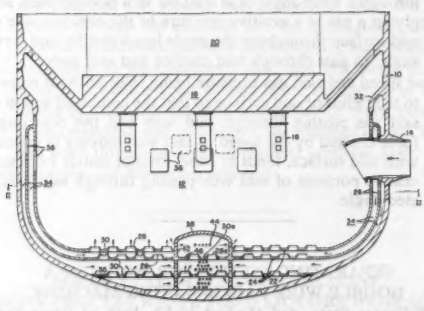
a take-off means downstream of said separator for removing the paper web from the bottom of said one wire, wherein said one wire extends from said separator and from said straight path along a straight run at an angle of less than ninety degrees relative to said straight path, said one wire extending away from the other wire in said straight run.

4,116,764

APPARATUS FOR CONTROLLING NUCLEAR CORE DEBRIS

Robert D. Jones, Irwin, Pa., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 11, 1976, Ser. No. 656,992
Int. Cl.[2] G21C *9/00*
U.S. Cl. 176—38 **11 Claims**



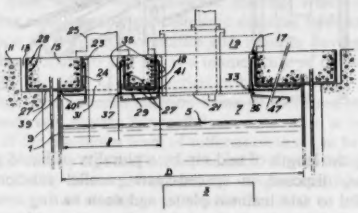
1. Apparatus for controlling debris resulting from meltdown of a nuclear reactor core normally cooled by a circulating liquid, said apparatus comprising a plurality of plates horizontally positioned beneath the core of said reactor and being in flow communication with said liquid under meltdown conditions, said plates disposed one atop another with a space therebetween, each said plate having a plurality of vertical openings therein each with a peripheral depression thereabout, adjacent openings being separated by a singular depression, said openings being spaced from one another such that substantially all of said openings are vertically aligned above a depression in the successively lower plate.

4,116,765

LIQUID METAL COOLED NUCLEAR REACTOR

Jean-Louis Boy Marcotte, Orsay; Georges Chevalier, Longjumeau; Janusz Gerij, St-Maur, and Jacques Leheu, Drancy, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Continuation-in-part of Ser. No. 680,780, Apr. 27, 1976, abandoned. This application Dec. 16, 1976, Ser. No. 751,202
Int. Cl.[2] G21C *11/08*
U.S. Cl. 176—38 **11 Claims**

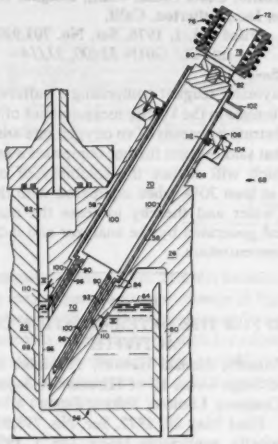


1. A liquid metal cooled reactor comprising a cylindrical primary vessel, a reactor core within said primary vessel, fuel assemblies in said core, a concrete slab roof closing said cylindrical primary vessel, a horizontal inner wall for said roof, a liquid metal coolant in said primary vessel, a hot gaseous medium above said liquid metal coolant, pumps and heat exchangers, a system of rotating shield plugs in said slab roof, a central opening in said roof for said system of rotating shield plugs, a first vertical wall for said roof delimitating said central opening, a plurality of passages in said roof for said heat exchangers and pumps, second vertical walls for said roof delimitating said passages, a third vertical wall for said roof located opposite to said primary vessel, a sheet metal plate covering said horizontal inner wall and said first, second and third vertical walls of said roof, a thermal protection device for said slab roof comprising an annular metallic planar plate of thickness smaller than and also equal to 25 mm extending beneath said slab roof parallel to said horizontal inner wall of said roof, an internal edge for said annular plate defined by said central opening, an external edge for said annular plate defined by said third vertical wall, openings in said annular plate located opposite to said passages for said heat exchangers and pumps, edges for said openings in said annular plate, a first vertical sealing shell surrounded by said first vertical wall of said roof, said first vertical sealing shell being fixely connected at one end to the inner edge of said metallic annular plate and at the other end to the sheet metal plate covering said first vertical wall of said roof at the upper part of said first vertical wall, second vertical sealing shells surrounded by said second vertical walls of said roof, each of said second vertical shells being fixely connected at one end to the edge of one of said openings in said metallic annular plate and at the other end to the sheet metal plate covering one of said second vertical walls of said roof at the upper part of said second vertical walls, said external edge of said annular metallic plate being connected to the sheet metal plate covering said third vertical wall of said roof by a connecting member, the radius of curvature of said connecting members being at least equal to 0.60 m, an inert gas trapped in closed spaces delimitated between said annular plate and said horizontal wall of said roof and between said first and second vertical walls of said roof and said first and second shells and means disposed in said roof along its horizontal inner wall and its vertical walls for evacuation of calories accumulated by said inert gas trapped in said closed spaces in contact with said annular plate.

4,116,766
ULTRASONIC DIP SEAL MAINTENANCE SYSTEM

Allan M. Poindexter, Pleasant Hills, and Herbert E. Ricks, Forest Hills, both of Pa., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Aug. 31, 1976, Ser. No. 719,310
Int. Cl.[2] G21C *9/00*
U.S. Cl. 176—38 **14 Claims**

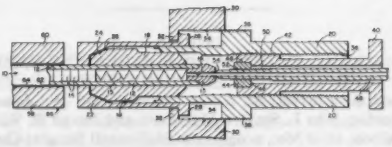


1. A system for maintaining operability of dip seals located in a vessel designed to contain radioactive material comprising:
- a closure head disposed on said vessel having at least one rotatable plug; said rotatable plug having an annulus therearound for enabling rotation of said rotatable plug;
- liquid dip seals disposed in said annulus for preventing the release of said radioactive material;
- an extension probe mounted on said rotatable plug and extending from a first end located above said rotatable plug to a second end located near said dip seal; and
- an ultrasonic transducer attached to said first end of said extension probe for producing vibrations in said extension probe that propagate from said first end to said second end for removing impurities from the metal surfaces of said dip seal and for wetting said metal surfaces thereby increasing the sealing capability of said liquid dip seal and promoting the rotatability of said rotatable plug.

4,116,767
FLUID PRESSURE APPARATUS FOR RECOVERING FUEL PELLETS FROM NUCLEAR FUEL ELEMENTS

Clarence D. John, Jr., Penn Hills, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 13, 1976, Ser. No. 749,869
Int. Cl.[2] G21C *19/26*
U.S. Cl. 176—87 **6 Claims**



1. Apparatus for removing nuclear fuel pellets from nuclear fuel elements comprising:
- collet means for supporting a fuel element and for limiting the expansion of the metallic sheath of said fuel element;
- a high pressure tube arranged in colinear alignment with said fuel element for conducting water into said fuel element thereby pressurizing said fuel element, thus expanding said metallic sheath away from said fuel pellets and enabling the easy removal of said fuel pellets;
- a body disposed about said collet means for manipulating said collet means; and
- a jamb nut movably disposed within said body for manipulating said high pressure tube into contact with said fuel element.

4,116,768
PROCESS FOR PRODUCING A PEPTIDE

Yoshikazu Isowa; Muneki Ohmori, both of Tokyo; Hideaki Kurita, Sagamihara; Tetsuya Ichikawa, Sagamihara; Masanari Sato, Sagamihara; Kaoru Mori, Sagamihara, and Kiyotaka Oyama, Sagamihara, all of Japan, assignors to (Zaidanhojin) Sagami Chemical Research Center, Tokyo, Japan

Division of Ser. No. 803,350, Jun. 3, 1977, which is a continuation of Ser. No. 734,010, Oct. 19, 1976, abandoned. This application Oct. 6, 1977, Ser. No. 839,848
Claims priority, application Japan, Apr. 19, 1976, 51-43686
Int. Cl.[2] C12D *13/06*
U.S. Cl. 195—29 **3 Claims**

1. A process for producing a peptide having the formula:

X—A—B—Y

wherein A and B are the same or different and each represents an amino acid residue or a peptide residue, X represents an amino acid protective group, Y represents a carboxyl protective group, which comprises:

reacting an acid component of an amino acid or peptide having an N-terminal protective group or a salt thereof which has the formula

X—A—OH

with an amine component of an amino acid or peptide having a C-terminal protective group or a salt thereof which has the formula

H—B—Y

in the presence of a metalloproteinase enzyme produced from microorganisms in an aqueous solution having a pH necessary to maintain the activity of said metalloproteinase enzyme;

wherein the combination of said acid component (I) and said amine component (II) is selected from the group consisting of L—I+DL—II, DL—I+L—II, and DL—I+D-L—II.

4,116,769
PROCESS FOR PREPARING 7-DEOXYSTEFFIMYCINOL

Vincent P. Marshall, Portage; David W. Elrod, Kalamazoo; James M. Koert, Kalamazoo; Elizabeth A. Reisender, Kalamazoo, and Paul F. Wiley, Kalamazoo, all of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 782,621, Mar. 30, 1977, Pat. No. 4,077,844. This application Nov. 16, 1977, Ser. No. 851,861
Int. Cl.[2] C12D *9/20*
U.S. Cl. 195—51 R **3 Claims**

1. A process for preparing the antibiotic 7-deoxysteffimycinol which comprises cultivating Aeromonas hydrophila, having the identifying characteristics of NRRL B-11099, in an aqueous nutrient medium under microaerophilic conditions in the presence of the antibiotic steffimycinol until bioconversion of steffimycinol to 7-deoxysteffimycinol, and recovering said 7-deoxysteffimycinol.

4,116,770
WAXY BARLEY STARCH WITH UNIQUE SELF-LIQUEFYING PROPERTIES

Kenneth J. Goering, and Robert Eslick, both of Bozeman, Mont., assignors to Research Corporation, New York, N.Y.

Filed Feb. 27, 1975, Ser. No. 553,680
Int. Cl.[2] C12D *13/02;* A01H *1/02;* C07G *17/00*
U.S. Cl. 195—63 **14 Claims**

1. A method for forming a liquified starch which comprises separating starch granules from the grain of the barley variety Washonupana which has been obtained by cross-breeding a first barley variety characterized by the hullness gene *n n* on chromosome 1, and a second barley variety which is characterized by the waxy endosperm gene *wx wx* on chromosome 1, which granules, when said granules are heated to a temperature of from 67° to 75° C., are self liquefying without the introduction of any outside source of enzymes,

admixing said starch granules with water to form a slurry,

heating said slurry until said starch granules form a paste which is then liquefied by the enzymatic activity of the amylase contained within said granules, without the addition of any other amounts of enzyme, and

recovering the liquefied starch.

9. Barley starch granules from the barley variety Washonupana which contain a sufficient amount of native α-amylase after separation from the grain so as to be characterized by being self-liquefying without the addition of further amounts of amylase, when said granules are heated to a temperature of from 67° to 75° C.

12. Barley starch granules from the barley variety Washonupana which are obtained by separation from the grain of a barley variety having the genetic characteristics of

$$\frac{lk2\ n\ wx}{lk2\ n\ wx}\text{, wherein}$$

wherein said granules contain an amount of amylase which is capable of effecting self-liquefication of said granules when the granules are heated to a temperature of from 67° to 75° C.

4,116,771
IMMOBILIZED SACCHARIFYING ENZYME PRODUCT AND PROCESS FOR PREPARATION THEREOF

Shmuel Amotz, Ganloese; Tage Kjaer Nielsen, Herlev; Poul Borge Rosenius Poulsen, Vaerloese, and Barrie Edmund Norman, Farum, all of Denmark, assignors to Novo Industri A/S, Bagsvaerd, Denmark

Filed Jun. 28, 1977, Ser. No. 810,788
Int. Cl.[2] C07G *7/02*
U.S. Cl. 195—63 **18 Claims**

1. An immobilized saccharifying enzyme product in particulate form, the saccharifying enzyme being selected from the group consisting of amyloglucosidase and maltogenic alpha-amylase, which product comprises carrier particles of granular casein having a coating of a liquid-permeable proteinaceous layer comprising the saccharifying enzyme and egg albumen cross-linked by reaction with glutaraldehyde.

4,116,772
FREE-FLOWING FUNGAL ENZYME COMPOSITION

Frederick D. Vidal, Englewood Cliffs, and Albert B. Gerrity, Hazlet, both of N.J., assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed Jul. 30, 1975, Ser. No. 600,323
Int. Cl.[2] C07G *7/02;* A21D *8/04*
U.S. Cl. 195—64 **8 Claims**

1. A process for preparing a fungal alpha-amylase composition suitable for use in the baking industry, which comprises uniformly blending a liquid fungal alpha-amylase concentrate having a minimum diastatic activity of 12,500 SKB units with a dried starch containing a maximum of about 3% moisture to obtain a free-flowing alpha-amylase composition having a diastatic activity of at least 1,000 SKB units and a moisture content of less than 8.5%.

4,116,773
ENZYMATIC REAGENT AND METHOD FOR INCREASING THE SENSITIVITY OF ENZYMATIC SUBSTRATE ANALYSES USING OXYGEN RATE ANALYZERS

Carole A. Polito, Costa Mesa, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Jul. 1, 1976, Ser. No. 701,920
Int. Cl.[2] G01N *33/00, 31/14*
U.S. Cl. 195—99 **9 Claims**

1. An enzymatic reagent comprising a buffered solution and an enzyme for use in the kinetic measurement of the concentration of a substrate by means of an oxygen rate analyzer, characterized in that said reagent further comprises a salt or a mixture of salts which will reduce the solubility of oxygen in said reagent by at least 30% when compared with the solubility of oxygen in water and thereby increase the magnitude of an output signal generated by the analyzer and indicative of said substrate concentration.

4,116,774
METHOD FOR THE DETERMINATION OF ENZYME ACTIVITIES

Sadamasa Minato; Atsushi Hattori; Yoshihiko Baba; Yuichiro Yabe, and Seigo Ueda, all of Hiromachi, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Filed May 20, 1977, Ser. No. 798,938
Claims priority, application Japan, Jun. 1, 1976, 51-63786
Int. Cl.[2] G01N *33/00, 31/14*
U.S. Cl. 195—99 **6 Claims**

1. In a method for the colorimetric determination of enzyme activity in a substance wherein the substance is treated with a mixture of a substrate and color reagent and is then colorimetrically analyzed, the improvement which comprises:

the substrate being an aromatic primary amine derivative selected from the group consisting of

L-glutamic acid γ-p-dimethylaminoanilide,
L-glutamic acid γ-p-diethylaminoanilide,
L-glutamic acid γ-p-methoxyanilide,
L-glutamic acid γ-p-hydroxyanilide,
S-benzyl-L-cysteine p-dimethylaminoanilide,
S-benzyl-L-cysteine p-hydroxyanilide,
S-benzyl-L-cysteine p-methoxyanilide,
L-leucine p-dimethylaminoanilide,
L-leucine p-hydroxyanilide,
L-leucine p-methoxyanilide and
N-benzyl-L-tyrosine p-dimethylaminoanilide

and said color reagent is an iron complex selected from the group consisting of sodium pentacyanoammineferroate and potassium pentacyanoammineferroate which is treated with a peroxide selected from the group consisting of sodium periodate, potassium periodate, potassium permanganate and hydrogen peroxide, and wherein said iron complex is further blended with an alkali metal hydrogencarbonate and low molecular dextran.

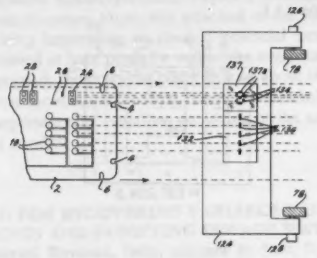
4,116,775
MACHINE AND PROCESS FOR READING CARDS CONTAINING MEDICAL SPECIMENS

Ronald A. Charles, St. Louis County; Paul W. Jones, St. Charles; John L. Staples, Florissant, and Joseph R. Wiegner, Ballwin, all of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed May 3, 1976, Ser. No. 682,728
Int. Cl.[2] C12K *1/04*
U.S. Cl. 195—103.5 M **25 Claims**

1. A process for examining a well containing a culture medium to determine if viable microorganisms exist in the well, a

dilution of said culture medium having the capability of undergoing a change in its light transmitting characteristics when a viable microorganism is in the dilution and is sustained by the culture medium, said process comprising: projecting light through the well at successive time intervals, for each time the light is projected detecting the light at a plurality of adjacent locations beyond the well substantially simultaneously to determine the intensity of such light at each location, whereby some locations may register a greater change in light intensity than other locations as the result of bubbles or foreign material affecting the intensity of the light to such locations; and indicating that a viable microorganism is present only when a selected number of locations register a decrease in light intensity in excess of a predetermined value.



4,116,776

DIAGNOSTIC BLOOD TEST AND KIT FOR DETECTING HUMAN CHORIONIC GONADOTROPIN

Milton H. Dalbow, Springdale; Hernan F. Acevedo, Allison Park, and Malcolm Slifkin, Pittsburgh, all of Pa., assignors to International Radioimmune Systems, Inc., Brighton, Mich.

Filed Apr. 19, 1976, Ser. No. 679,251
Int. Cl.[2] G01N *31/14*
U.S. Cl. 195—103.7 **19 Claims**

1. A diagnostic blood test for human chorionic gonadotropin comprising the steps of:

(a) separating the white blood cells from the whole blood sample to be tested;
(b) treating the cells with neuraminidase;
(c) washing the cells to remove excess neuraminidase;
(d) treating the cells with antiserum specific to the beta-subunit of human chorionic gonadotropin, said antiserum including a clinically detectable label;
(e) washing excess antiserum from the cells; and
(f) clinically determining the presence or absence of said label; the presence of said label indicating the presence of human chorionic gonadotropin in the blood sample tested.

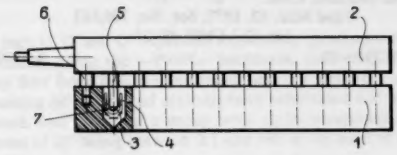
4,116,777

APPARATUS FOR AND A METHOD OF THE DETERMINATION OF INFLUENZA NEURAMINIDASE

Gyula Takátsy; Katalin Barb; István Murányi, and Ferencné Burda, all of Budapest, Hungary, assignors to Labor Muszeripari Muvek, Esztergom, Hungary

Filed Dec. 6, 1976, Ser. No. 747,781
Claims priority, application Hungary, Dec. 30, 1975, LA 880
Int. Cl.[2] G01N *31/14*
U.S. Cl. 195—127 **2 Claims**

1. Device for use in carrying out reaction such as the determination of influenza neuraminidase, comprising a titration plate having series of bores for accommodating reaction mixtures, a heater block with series of heating elements immersible



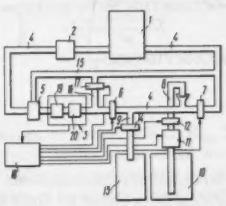
into the bores, and locating elements for ensuring positioning of the heater block relative to the titrating plate.

4,116,778

PLANT FOR CONTINUOUS CULTIVATION OF MICROORGANISMS

Viktor Vasilievich Belousov, ulitsa akademika Pavlova, 7, korpus 9, kv. 33, Moscow; Vadim Moiseevich Glazer, ulitsa Mayakovskogi, 8, kv. 50, Zhukovsy Moskovskoi oblasti, and Sergei Vasilievich Shestakov, ulitsa Garibaldi, 15, korpus 1, kv. 100, Moscow, all of U.S.S.R.

Continuation of Ser. No. 432,334, Jan. 10, 1974, abandoned. This application Aug. 19, 1976, Ser. No. 715,902
Int. Cl.[2] C12B *1/00*
U.S. Cl. 195—139 **3 Claims**



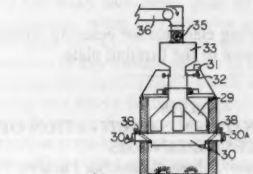
1. A plant for the continuous cultivation of microorganisms, comprising a fermenter for growing a suspension of microorganisms, which comprises a nutrient medium with a corresponding culture of microorganisms added thereto, said fermenter having an inlet and outlet, an annular duct having one end connected to the inlet into said fermenter and a second end connected to the outlet thereof for circulating the suspension of microorganisms therethrough; a recirculating pump installed in said annular duct downstream of said fermenter, and through which the suspension of microorganisms is pumped for effecting recirculation thereof; a process parameter measuring unit installed in said annular duct downstream of said recirculating pump; said fermenter, said recirculating pump, and said process parameter measuring unit being connected in series by said annular duct to form a recirculating circuit for continuously circulating the suspension of microorganisms therethrough; two locking means spaced apart in said annular duct downstream of said process parameter measuring unit; a supply line connected to the section of said annular duct between said locking means; a nutrient medium storage container connected to said supply line; an overflow connection connected to the section of said annular duct between said locking means for withdrawing the suspension of microorganisms from the section of said annular duct between said locking means; a microorganism suspension collector connected to said overflow connection; a metering pump located in said supply line for supplying measured quantities of the nutrient medium from said nutrient medium storage container to the section of the annular duct between said locking means and for; discharging therefrom an equal volume of the suspension of microorganisms into said microorganism suspension collector.

4,116,779

STARTING PROCEDURE FOR INTERNAL COMBUSTION VESSELS

Harry A. Harris, Rifle, Colo., assignor to Paraho Corporation, Grand Junction, Colo.

Filed Mar. 23, 1977, Ser. No. 780,413
Int. Cl.[2] C10B *49/04*
U.S. Cl. 201—34 5 Claims



1. A start-up procedure for the continuous, internal combustion retorting process for a bed of oil shale in a vertical shaft vessel which has upper and mid level air-gas injection distributors intermediate the top and bottom of the vessel, bottom gas injection means and has shale feed means and retorted shale withdrawal means, comprising:

(a) forming a partial bed of shale in the vessel having a surface above the upper level air-gas injection distributor;

(b) placing a plurality of ignited railroad type flare ignitors spacedly across the surface of the bed;

(c) initially passing air into the shale bed through both distributors and then gradually passing an increasing volume of air through said upper and reducing air volume to the mid level air-gas injection means, and at flow rates below the flame propagation rate to hold combustion in the shale bed and above the upper air-gas injection means;

(d) simultaneously with step (c) injecting a combustible gaseous fuel through said upper distributor into the bed with the air to produce a rich mixture that is not combustible at the temperature of the bed of shale until combined with the air from the mid-distributor thereby forming a combustion zone above the upper distributor;

(e) initiating and gradually increasing raw shale feed onto the bed, covering the ignitors;

(f) initiating flow of recycle gas into the bed;

(g) initiating and gradually increasing retorted shale withdrawal, at a rate less than increased raw shale feed of (e), to thereby gradually raise the level of the shale bed to normal operating height in the vessel during ignition of said ignitors;

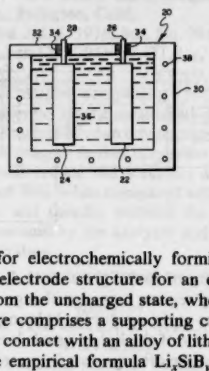
(h) gradually decreasing flow of gaseous fuel to a shut-off when ignition of shale is achieved during the time of ignition of said ignitors.

4,116,780

METHOD OF MAKING A LITHIUM-SILICON BORON ELECTRODE FOR ELECTRICAL ENERGY STORAGE DEVICE

Anthony F. Sammells, Newbury Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Division of Ser. No. 793,815, May 5, 1977, Pat. No. 4,076,905.
This application Sep. 12, 1977, Ser. No. 832,315
Int. Cl.[2] H01M *10/44*
U.S. Cl. 204—2.1 3 Claims



1. A method for electrochemically forming a composite negative lithium electrode structure for an electrical energy storage device from the uncharged state, wherein the formed electrode structure comprises a supporting current-collecting matrix in intimate contact with an alloy of lithium, silicon, and boron having the empirical formula Li_xSiB_y, where x has a value from 1 to 5 and y has a value from 0.1 to 3, which includes the steps of:

providing a supporting current-collecting matrix in intimate contact with an alloy of boron and silicon, the boron being present in an amount from about 11 to 50 atom percent and the silicon being present in an amount from about 89 to 50 atom percent;

immersing the current-collecting matrix containing the boron-silicon alloy in a lithium-containing molten salt electrolyte in a cell in opposing relation to a positive electrode structure, and

electrochemically charging the boron-silicon electrode structure at a selected voltage or current for a time sufficient to form the desired lithium-silicon-boron alloy negative electrode structure.

4,116,781

REJUVENATION OF MEMBRANE TYPE CHLOR-ALKALI CELLS BY INTERMITTENTLY FEEDING HIGH PURITY BRINES THERETO DURING CONTINUED OPERATION OF THE CELL

Martin M. Dorio, Mentor, and Alan J. Stacey, Parma, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Apr. 19, 1977, Ser. No. 788,836
Int. Cl.[2] C25B *1/20, 1/26, 15/08, 13/08*
U.S. Cl. 204—98 13 Claims

1. The method of operating a membrane type chlor-alkali electrolytic cell so as to maximize current efficiency during long-term continuous operation comprising, feeding an impure brine solution containing membrane contaminating quantities of multivalent metallic impurities to said cell which gradually contaminates the membrane in the cell and causes a loss in current efficiency, replacing said impure brine feed with a pure brine feed containing less than 0.5 milligrams per liter of each multivalent metal contaminant found in said impure brine solution excluding complexed hardness ions for a period of time to improve the current efficiency and thereafter returning to feeding said impure brine solution, said replacement of the impure brine feed with said pure brine feed being made intermittently with sufficient frequency so as to prevent the current efficiency of the cell from dropping below 88% of the cell's original current efficiency.

4,116,782

CORROSION PREVENTION SYSTEM

Charles K. Bon, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 7, 1977, Ser. No. 774,838
Int. Cl.[2] C23F *13/00*
U.S. Cl. 204—147 **5 Claims**

1. A method to reduce corrosion of a grounded metal conduit in an aqueous electrolyte conduit system including a nonmetallic conduit system physically attached to the metal conduit comprising impressing an electric potential between an anode positioned at least partially within the nonmetallic conduit and a ground, the potential being at least about the difference between the electrochemical reaction potentials, at the reaction temperature, of reactions occurring at the anode and at the metal conduit.

4,116,783

METHOD FOR RECOVERING VARIABLE-VALENCY ELEMENTS AND PURIFYING SEWAGE WATERS

Gianni Generini, Ravenna, Italy, assignor to Anic, S.p.A., Palermo, Italy

Filed Jan. 10, 1977, Ser. No. 757,881
Claims priority, application Italy, Mar. 23, 1976, 21472 A/76
Int. Cl.[2] C02C *5/12*
U.S. Cl. 204—150 **7 Claims**

1. An improved method of removing a variable-valency element from sewage water which contains a compound of said element, with concurrent purification of said water, by an oxidation-reduction reaction whereby the variable-valency element of said compound is reduced to a value that permits precipitation thereof through alkalization, wherein the improvement comprises, causing said sewage water to flow through a shortcircuited electrode system containing a cathode and an anode, one of which is electropositive and the other of which is electronegative, in the presence of an effective amount of an element other than the cathode material and having a more electropositive character than the anode element.

4,116,784

METHOD FOR CROSS-LINKING POLYETHYLENE WITH AN IONIZING RADIATION

Fumio Hosoi, Takasaki; Miyuki Hagiwara, Maebashi, and Kunio Araki, Takasaki, all of Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan

Filed Aug. 25, 1976, Ser. No. 717,866
Claims priority, application Japan, Aug. 25, 1975, 50-102798; Aug. 25, 1975, 50-102799
Int. Cl.[2] C08F *8/00*
U.S. Cl. 204—159.16 **8 Claims**

1. A method for cross-linking polyethylene, characterized in that polyethylene is blended with dipropargyl maleate and a copolymer selected from the group consisting of an ethylene-acrylonitrile copolymer, an ethylene-acrylic ester copolymer, an ethylene-substituted acrylic ester copolymer, an ethylene-vinyl acetate copolymer, an ethylene-substituted vinyl acetate copolymer and mixtures thereof, and the resulting mixture is irradiated with an ionizing radiation.

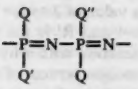
4,116,785

PHOSPHONITRILIC POLYMERS WITH CURABILITY BY SULFUR ACCELERATED CURES OR RADIATION CURES

Tai Chun Cheng, Akron, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Feb. 27, 1976, Ser. No. 662,074
Int. Cl.[2] C08F *8/00, 8/18*
U.S. Cl. 204—159.14 **13 Claims**

1. Sulfur cured non-fluorinated linear polyphosphazenes represented by the general formula



in which Q, Q′ and Q″ represent monovalent groups randomly distributed along the —P=N— backbone, each of Q and Q′ being free from flourine and being selected from the group consisting of alkoxy and aryloxy, both substituted and unsubstituted, and Q″ being a group with olefin unsaturation, the amount of Q″ being between 0.1 and 5% of the total of Q, Q′ and Q″.

4,116,786

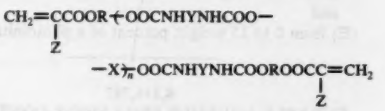
RADIATION CURABLE COATING COMPOSITIONS CONTAINING AN ACRYLATE-CAPPED, POLYETHER URETHANE AND A POLYSILOXANE

Leonard Edward Hodakowski, Saint Albans, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jun. 8, 1976, Ser. No. 694,157
Int. Cl.[2] C08F *2/46, 30/08*
U.S. Cl. 204—159.13 **8 Claims**

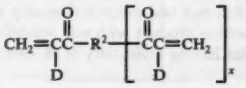
1. A radiation curable coating composition, convertible to a hard, flexible coating having inherent surface lubricity, comprising:

(A) from 5 to 70 weight percent of an acrylate-capped polyether urethane of the formula

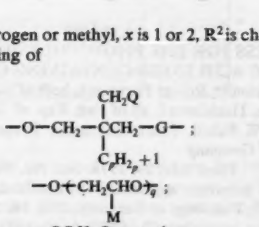


wherein Z is hydrogen or methyl; R is C_mH_{2m}; X is the residue of a polyether glycol having an average molecular weight from 300 to 4,000 after its reaction with an organic diisocyanate; Y is the residue of an organic diisocyanate after its reaction with a polyether glycol and a hydroxyalkyl acrylate; *m* has a value from 1 to 5; and *n* has a value from 1 to 5;

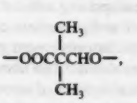
(B) from 80 to 5 weight percent of a low molecular weight polyfunctional acrylate having an average molecular weight of from 170 to 1,200 and defined by the formula



wherein D is hydrogen or methyl, *x* is 1 or 2, R^2 is chosen from the group consisting of

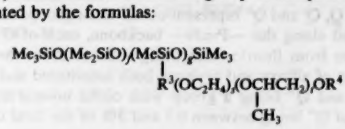


wherein Q is hydrogen or —O—, G is —O— or



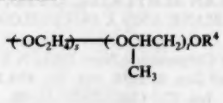
M is hydrogen or alkyl having 1 to 2 carbon atoms, *p* has a value of 1 to 3, *q* has a value of 2 to 6, *r* has a value of 2 to 15, *r'* has a value of 2 to 4 and R' is the residue of an organic diisocyanate after its reaction with a hydroxyalkyl acrylate;

(C) from 0.1 to 2.0 weight percent of a polyether-functional polysiloxane chosen from the group of compounds represented by the formulas:



and $MeSi[(OSiMe_2)_fM']_3$

wherein R^3 is alkylene having from 1 to 4 carbon atoms; R^4 is alkyl having from 1 to 4 carbon atoms; at least 50% of the M' units have the structure



and the remaining M' units are lower alkoxy; Me is methyl; *f* has a value from 10 to 100; *g* has a value from 1 to 20; and *s* to *t* are numbers such that the molecular weight of the polyoxyalkylene units is from 1,200 to 3,000 and from 20 to 80 weight percent of the oxyalkylene units are oxyethylene;

(D) from 0.5 to 80 weight percent of a monofunctional acrylate having a molecular weight of from 100 to 400; and

(E) from 0 to 15 weight percent of a photoinitiator.

4,116,787

CURABLE AQUEOUS EMULSIONS CONTAINING ETHYLENICALLY UNSATURATED TERTIARY AMINES

Leslie Gatechair, Barrington, Ill., assignor to DeSoto, Inc., Des Plaines, Ill.

Filed Nov. 6, 1975, Ser. No. 629,558
Int. Cl.[2] C08F *2/50*; C08L *33/02, 33/08*
U.S. Cl. 204—159.23 **18 Claims**

1. An aqueous emulsion curable coating composition comprising water having emulsified therein viscous droplets comprising polyethylenically unsaturated organic compound carrying at least one tertiary amine group reacted with a solubilzing acid to form a quaternary salt, said emulsion having a pH of from 5.0 – 8.5, and said polyethylenically unsaturated tertiary amine reaction product with said solubilizing acid in the absence of water having a viscosity of at least 200 centipoises.

4,116,788

PROCESS FOR THE PHOTOPOLYMERIZATION OF ACRYLIC ACID ESTER-CONTAINING COMPOSITIONS

Werner Schmitt; Robert Purrmann, both of Starnberg, and Peter Jochum, Hechendorf, all of Fed. Rep. of Germany, assignors to ESPE Fabrik Pharmazeutischer Praparate GmbH, Fed. Rep. of Germany

Filed Nov. 19, 1976, Ser. No. 743,323
Claims priority, application Switzerland, Nov. 21, 1975, 015138/75; Fed. Rep. of Germany, Oct. 14, 1976, 2646416
Int. Cl.[2] C08F *2/46, 4/00*
U.S. Cl. 204—159.23 **10 Claims**

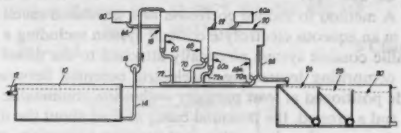
1. In a photopolymerizable composition wherein said photopolymerizable portion consists essentially of at least one photopolymerizable ester comprising a di- or tri-functional acrylic or methacrylic acid ester and a benzoin compound photopolymerization activator, the improvement comprising including in said composition from about 0.1 to about 20 percent by weight of the photopolymerizable ester of an organic phosphite photopolymerization activator.

4,116,789

CLARIFIER AND METHOD

Arthur S. King, 8021 Cherokee La., Leawood, Kans. 66206

Filed Apr. 4, 1977, Ser. No. 784,559
Int. Cl.[2] B03C *5/00*
U.S. Cl. 204—180 R **3 Claims**



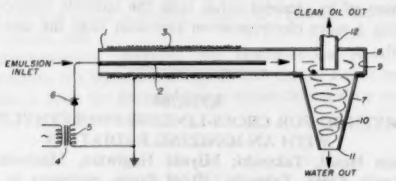
1. In a method of removing suspended solids from a fluid, the improvement that includes the step of directing the fluid to be treated between a pair of opposed, oppositely electrically charged, corrugated surfaces in a direction transverse to the longitudinal axes of the corrugations so as to subject the fluid to an undulating action that encourages flocculation of the solids through direct impingement against one another, said surfaces being so arranged that peaks of the corrugations facing toward the fluid are disposed directly opposite one another so as to subject the fluid to alternating forces of constriction and expansion along the flow path in conjunction with sequential exposure to concentrated electrical lines of force.

4,116,790

METHOD AND APPARATUS FOR SEPARATION OF FLUIDS WITH AN ELECTRIC FIELD AND CENTRIFUGE

Floyd Leon Prestridge, Tulsa, Okla., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Jul. 18, 1977, Ser. No. 816,227
Int. Cl.[2] B03C *5/00*
U.S. Cl. 204—188 **15 Claims**



1. A process for separating a first fluid which is finely dispersed in a second fluid, including,

flowing the first and second fluids as a mixture of immiscible fluids in a path,

establishing an electric field in the path to coalesce the dispersed fluid into drops of predetermined size,

flowing all the mixture in a second path,

and generating a predetermined centrifugal force on all the mixture in the second path to cause the coalesced drops to agglomerate without re-dispersion into the second fluid and separate from the second fluid.

8. An electric-centrifugal processor for mixtures of multiple fluids, including,

a first vessel,

a source of a mixture of multiple fluids,

a flow path formed for the mixture within the first vessel,

electrodes mounted within the first vessel and on each side of the flow path,

a source of electric energy connected to the electrodes with which an electric field is established by the electrodes so that the fluid mixture flows in the field while flowing down the path to coalesce one of the fluids into drops of predetermined size within another of the fluids,

a second vessel connected to the first vessel so as to receive the entire fluid mixture from the path of the first vessel,

and means within the second vessel for developing a prede-

termined centrifugal force on the entire fluid mixture received from the first vessel to move the coalesced drops of the one of the fluids into an agglomeration separate from the other of the fluids without redispersion of the one fluid into the other fluid.

4,116,791
METHOD AND APPARATUS FOR FORMING A DEPOSIT BY MEANS OF ION PLATING USING A MAGNETRON CATHODE TARGET AS SOURCE OF COATING MATERIAL

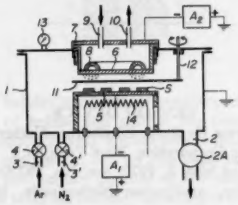
Bogdan Zega, Geneva, Switzerland, assignor to Battelle Memorial Institute, Carouge/Geneva, Switzerland

Filed May 18, 1977, Ser. No. 798,160

Claims priority, application Switzerland, May 19, 1976, 6237/76

Int. Cl.² C23C *15/00*

U.S. Cl. 204—192 N **25 Claims**



1. A method of ionically cleaning and coating a substrate, comprising the steps of:

placing the substrate in the immediate vicinity of a cathode within a conductive enclosure containing a rarefied gaseous atmosphere;

biasing said cathode sufficiently negative with reference to said enclosure to generate a glow discharge resulting in an ionic cleaning of the substrate with formation of a dark space adjacent said cathode;

energizing a target electrode of coating material, confronting said cathode at a location in said enclosure beyond said dark space, with a negative voltage of lower absolute magnitude than that of cathode to generate a sputtering discharge between said target electrode and said enclosure, the potential difference between said cathode and said target electrode being sufficient to produce a discharge current at said target electrode of a magnitude substantially equal to that produced upon a like energization of the target electrode in the absence of said cathode; and

setting up a magnetic field across said target electrode with lines of force closed on the side facing said cathode to establish an endless track for the circulation of secondary electrons emitted by said target electrode, with resulting intensification of the rate of emission of ions of coating material toward said substrate to exceed the rate of substrate erosion by said glow discharge whereby a deposit of coating material is built up on said substrate.

16. An apparatus for ionically cleaning and coating a substrate, comprising:

a conductive enclosure forming an ionization chamber, said enclosure being provided with circulation means for maintaining a rarefied gaseous atmosphere in said chamber;

a cathode in said chamber insulated from said enclosure;

a first direct-current source connected between said enclosure and said cathode for maintaining the latter at a negative potential relative to said enclosure sufficient to generate a glow discharge therebetween resulting in an ionic cleaning of a substrate disposed in the immediate vicinity of said cathode in said chamber, with formation of a dark space adjacent said cathode;

a generally plate-shaped target electrode adapted to carry a coating material disposed in said chamber opposite said cathode at a location beyond said dark space in insulated relationship with said enclosure;

a second direct-current source connected between said target electrode and said enclosure for biasing said target electrode with reference to said enclosure at a negative potential less than that of said cathode but high enough to generate a sputtering discharge between said target electrode and said enclosure, the first and second direct-current sources being adapted to maintain the potential difference between said target electrode and said cathode at a value sufficient to produce a discharge current at said target electrode of a magnitude substantially equal to that produced by said second source in the absence of said cathode; and

magnetic means adjacent said target electrode with north and south poles trained along concentric lines upon a surface of said target electrode remote from said cathode, for providing a magnetic field with lines of force closed on the side facing said cathode to establish an endless track for the circulation of secondary electrons emitted by said target electrode with resulting intensification of the rate of emission of ions of coating material toward said substrate to exceed the rate of substrate erosion by said glow discharge whereby a deposit of said coating material is built up on said substrate.

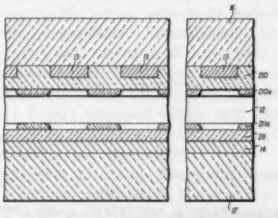
4,116,792
METHOD OF MAKING GAS DISCHARGE DISPLAY DEVICE WITH PROTECTIVE DIELECTRIC

Bernard W. Byrum, Jr., Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 560,348, Mar. 21, 1975. This application Mar. 24, 1977, Ser. No. 780,887

Int. Cl.² C23C *15/00*

U.S. Cl. 204—192 E **9 Claims**



1. In a process for the manufacture of a gas discharge device having a gaseous medium, a plurality of gaseous discharge sites and at least one active dielectric surface exposed to the gaseous medium at each discharge site, the improvement which comprises:

coating the active dielectric surface with a protective film in an amount sufficient to prevent the formation of contaminants on the active dielectric surface;

and applying a gaseous discharge voltage at each discharge site sufficient to sputter away the protective film in the vicinity of each said site without sputtering the active dielectric surface so as to expose the contaminant free active dielectric surface to gaseous medium contact.

4,116,793

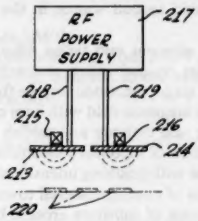
GLOW DISCHARGE METHOD AND APPARATUS

Alan S. Penfold, Playa del Rey, and John A. Thornton, Los Angeles, both of Calif., assignors to Telic Corporation, Santa Monica, Calif.

Division of Ser. No. 535,429, Dec. 23, 1974, Pat. No. 4,041,353, which is a continuation of Ser. No. 254,504, May 18, 1972, abandoned, and a continuation-in-part of Ser. No. 178,240, Sep. 7, 1971, Pat. No. 3,884,793. This application May 31, 1977, Ser. No. 801,857

Int. Cl.[2] C23C *15/00*

U.S. Cl. 204—192 R **25 Claims**



1. A method of generating a glow discharge, comprising the steps of:

supporting a pair of planar electrodes within a working gas environment;

applying electrical voltage across said electrodes; and

forming a magnetic field which defines, together with said electrodes, at least one trap for containing substantially all electrons emitted from said electrodes and having sufficient energy to further ionize said working gas.

9. Glow discharge apparatus, comprising:

a pair of planar electrodes;

mounting means for supporting said electrodes in close, spaced apart relationship in a low pressure working gas environment;

power supply means for supplying an electrical voltage across said pair of electrodes; and

magnetic field means for forming a magnetic field which defines with said electrodes at least one completely closed trap for containing substantially all electrons emitted from said electrodes and having sufficient energy to further ionize said working gas.

4,116,794

GLOW DISCHARGE METHOD AND APPARATUS

Alan S. Penfold, Playa del Rey, and John A. Thornton, Los Angeles, both of Calif., assignors to Telic Corporation, Santa Monica, Calif.

Division of Ser. No. 535,429, Dec. 23, 1974, Pat. No. 4,041,353, which is a continuation of Ser. No. 254,504, May 18, 1972, abandoned, and a continuation-in-part of Ser. No. 178,240, Sep. 7, 1971, Pat. No. 3,884,793. This application May 31, 1977, Ser. No. 802,060

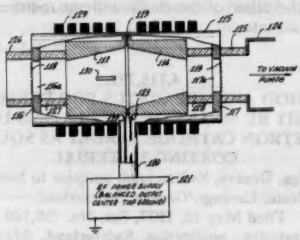
Int. Cl.[2] C23C *15/00*

U.S. Cl. 204—192 R **33 Claims**

1. A method of generating a glow discharge internally of a pair of hollow electrodes, comprising the steps of:

supporting a pair of hollow electrodes in end to end relationship within a working gas environment;

applying electrical voltage across said pair of electrodes; and forming a magnetic field which defines, together with said electrodes, at least one trap for containing substantially all



electrons emitted from said electrodes and having sufficient energy to further ionize said working gas.

4,116,795

SENSOR DEVICE

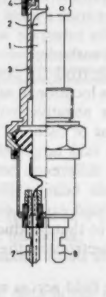
Herman Lambertus De Jong, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 2, 1977, Ser. No. 792,648

Claims priority, application Netherlands, May 12, 1976, 7605042

Int. Cl.[2] G01N *27/46*

U.S. Cl. 204—195 S **1 Claim**

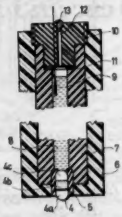


1. A sensor device for measuring the oxygen concentration in the exhaust gases of combustion engines wherein said gases include particles that are to be filtered, comprising a sensor element that comprises a body element of stabilized ZrO_2 having electrode layers on both sides, said device further comprising a filter member that comprises a combination of at least three apertured partitions, a first one of said partitions being disposed between a second partition and a third partition and said partitions being spaced from each other, said partition apertures having diameters which significantly exceed the average diameter of the particles to be filtered and not being in register at least in the two outermost said partitions, so that this combination of apertures changes the direction of the gas stream and coarser said particles are separated from the gas stream; and further comprising a filter element that is a fine-meshed, sintered or fibrous filtering material and is present between two of said partitions located closer to said sensor element than the outermost said partition, said filter member being disposed between said sensor and the source of said exhaust gases.

4,116,796
SELECTIVE HALIDE AND SULFIDE SENSITIVE ELECTRODES

Jenö Havas; Elek Doktor; Märton Patkö, and Ernö Pungor, all of Budapest, Hungary, assignors to Radelkis Elektrokemiai Muszergyarto Szovetkezet, Budapest, Hungary

Continuation-in-part of Ser. No. 570,655, Apr. 23, 1975, abandoned. This application Mar. 23, 1977, Ser. No. 780,264
Int. Cl.[2] G01N *27/46*
U.S. Cl. 204—195 M 4 Claims

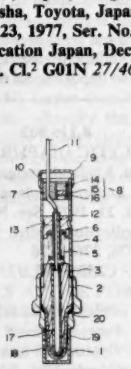


1. Selective halide- and sulfide- sensitive electrode for the determination of halide and sulfide ion concentrations and activities in solution having a solid sensor built up of a halide and/or sulfide precipitate, and an electrode body built in such a manner that one surface portion of the sensor contacts the sample solution whereas another surface portion of the sensor, isolated by the electrode body from the portion in contact with the sample, contacts an electrolyte solution of constant ion concentration, the latter being equipped with a potential outlet terminal, comprising a sensor in the form of a solid block, the surface portion of said block contacting the sample solution being spherical or of a curved surface void of edges or apices; the surface portion of said block not contacting the sample solution or the solution of constant ion concentration being connected to an elastic layer, which in turn is in contact with the wall of a tubular plastic electrode body, wherein said block is built up of three layers perpendicular to the longtitudinal axis thereof, the materials of the layers being a metal halide or a mixture of metal halides, a metal sulfide or a mixture of metal sulfides or a mixture of metal halides and metal sulfides, with the proviso that a metal layer is between the two metal salt layers.

4,116,797
OXYGEN SENSOR

Takao Akatsuka, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed May 23, 1977, Ser. No. 799,694
Claims priority, application Japan, Dec. 3, 1976, 51/145326
Int. Cl.[2] G01N *27/46*
U.S. Cl. 204—195 S 11 Claims

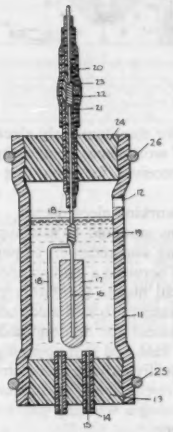


1. An automotive exhaust system oxygen sensor utilizing atmospheric oxygen as a reference gas, comprising, a solid electrolyte tube with a closed tip; an outer electrode and an inner electrode formed respectively, on the outside and the inside of said tube; a housing supporting said tube; electrically conductive means to take out the output of said inner electrode; a cover supported by said housing; means defining an air passage at an end of said cover; and a multi-layer filter provided in said air passage, said filter comprising a heat-resistant material with a low rate of thermal expansion, and said filter excluding water, dust and other foreign matter from contact with said inner electrode.

4,116,798
REFERENCE ELECTRODE FOR USE AT HIGH TEMPERATURES AND PRESSURES

Ingrid Joan Magar, Tuxedo, and Patrick Evan Morris, Warwick, both of N.Y., assignors to The International Nickel Company, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 659,642, Feb. 20, 1976, abandoned. This application Jun. 16, 1977, Ser. No. 807,052
Int. Cl.[2] G01N *27/30*
U.S. Cl. 204—195 F 6 Claims



1. A reference electrode adapted for immersion in an aqueous liquid at high-temperature and high-pressure comprising:

(a) a heat-expandable plastic tube body sealed at one end with a heat-expandable, heat-resistant plastic bridge mounting plug and sealed at the opposite end with an electrode mounting plug enclosing a silver wire, a portion of said silver wire having a fused silver chloride bead, said silver wire fixably disposed within said tube body and immersed within a soluble chloride electrolyte solution contained within said tube body;

(b) a corrosion-resistant bridge restraining means circumjacent said tube body opposite the junction of said tube body and said bridge mounting plug, said restraining means selected to have a coefficient of expansion lower than the coefficient of expansion of said bridge mounting plug;

(c) a pre-shrunk bridge sleeve surrounding bridge fibers mounted within said bridge mounting plug, whereby heat expansion of said bridge mounting plug against said bridge restraining means directs lateral forces to seal said bridge mounting plug to said tube body while compressing said bridge fibers, and

(d) a heat sealing vent means in the wall of said tube body positioned above said electrolyte solution to substantially inhibit bubble formation through internal and external pressure equalization during pressurization and heating of said reference electrode, said heat sealing vent means adapted to close during heating to a temperature above about 300° C.

4,116,799

MACHINE FOR THE SIMULTANEOUS ELECTROCHEMICAL PROCESSING OF MULTIPLE WORKPIECES

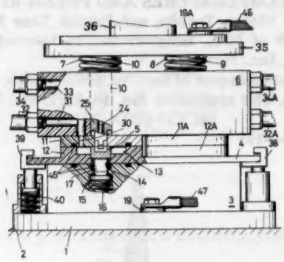
Peter Gosger, Solingen, Burg; Paul Gerhard Pott, Wermelskirchen, and Bernd Wolter, Remscheid, all of Germany, assignors to AEG-Elotherm, G.m.b.H., Remscheid-Hasten, Germany

Filed Sep. 7, 1976, Ser. No. 720,643

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1975, 2540998

Int. Cl.[2] B23P *1/04, 1/14*

U.S. Cl. 204—224 M 4 Claims



1. A machine for simultaneously electrochemically machining a plurality of workpieces comprising;

a workpiece receiver for mounting a plurality of workpieces;

a plurality of working electrodes;

guide rail means mounted on said support base, for removably mounting said receiver, to permit horizontal movement thereof between a loading and a processing position, said guide rail means accurately positioning said workpieces with respect to said electrodes for machining;

a clamping element for holding said workpieces between said support base and said clamping element;

means for vertically moving said clamping element to clamp and release, respectively, said receiver;

means for defining a working gap between each electrode and workpiece;

means for supplying electrolyte to and removing electrolyte from said gaps; and

means for connecting a source of eroding current to said electrodes and workpieces.

4,116,800

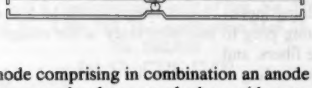
ELECTROLYTIC CELL WITH REDUCED INTER-ELECTRODE GAP

John E. Currey; Colin S. McLarty, both of Lewiston, and Donald H. Porter, Tonawanda, all of N.Y., assignors to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.

Filed Dec. 29, 1976, Ser. No. 755,307

Int. Cl.[2] C25B *11/02, 13/08;* H01B *13/00;* B21D *22/00*

U.S. Cl. 204—252 14 Claims



1. An anode comprising in combination an anode post and a pair of planar anode plates attached to said post, parallel to each other, the distance between said parallel plates being the diameter of said anode post, wherein the improvement comprises an expanded anode having each plate bent into a position wherein the plates are substantially parallel to each other and the distance between said parallel portion of said plates is greater than the diameter of the anode post except where the plate is attached to said post.

4,116,801

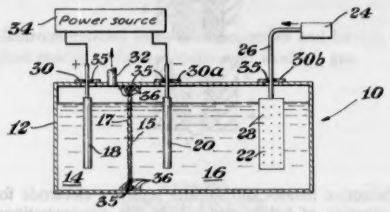
APPARATUS FOR ELECTROWINNING MULTIVALENT METALS

Paul R. Juckniess, and David R. Johnson, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 517,567, Oct. 24, 1974, abandoned. This application Sep. 13, 1976, Ser. No. 722,916

Int. Cl.[2] C25C *3/22, 3/28, 7/04*

U.S. Cl. 204—247 76 Claims



1. An electrolytic diaphragm cell, without means to adjust the diaphragm pore size, for the production of metallic titanium in a molten salt bath comprising:

a body adapted to contain the bath and to separate the bath from the ambient atmosphere;

an anode compartment disposed within said body;

a deposition cathode compartment disposed within said body and spaced apart from said anode compartment by a diaphragm;

at least one anode, adapted to be at least partially immersed in the bath, disposed within said anode compartment;

at least one deposition cathode, adapted to be at least partially immersed in the bath, disposed within said cathode compartment;

at least one foraminous diaphragm with a porous metal substrate and a metal coating thereon, the diaphragm being resistant to the corrosive environment within the containing means and having a diaphragm coefficient of greater than zero to about 0.5 and a flow coefficient within the range of from about 0.1 to about 25, the diaphragm being adapted to be at least partially immersed in the bath to space apart said anode and cathode compartments;

at least one feed means adapted to provide titanium ions to the bath;

a means to remove a gas from said anode compartment; and

a means to provide sufficient electrical energy to said anode and said cathode to deposit solid titanium on said cathode.

4,116,802

ELECTROLYTIC DIAPHRAGM CELLS

Frank Smith, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Jul. 21, 1977, Ser. No. 817,677

Claims priority, application United Kingdom, Aug. 4, 1976, 32490/76; Sep. 10, 1976, 37604/76

Int. Cl.[2] C25B *9/00, 11/02, 11/10*

U.S. Cl. 204—252 14 Claims

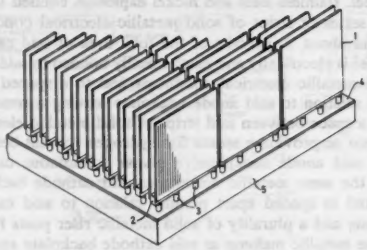
1. An assembly for an electrolytic cell the assembly comprising

a base plate of an electrically conductive metal which is unattacked by the electrolyte to be used in the cell,

a plurality of anodes or anode support members mounted on and attached in electrical contact with one surface of the base plate, and

an electrical conductor in the form of a metallic sheet electri-

cally conductively bonded to the other surface of the base plate, the bonding having been achieved by placing a metallic inter layer between the base plate and the conductor sheet, heating the inter layer to a temperature at which the inter layer is molten, which temperature is at



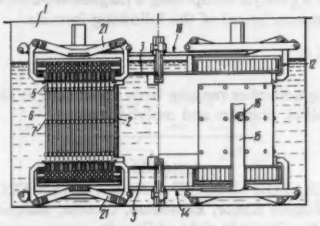
least 427° C. but is lower than the melting points of the base plate and the conductor sheet, and applying elevated pressure to the base plate and to the conductor sheet sufficient to substantially eliminate voids between the base plate and the conductor sheet.

4,116,803

METHOD AND APPARATUS FOR FORMING CERMET ELECTRODES FOR ALKALINE ACCUMULATORS

Ivan Alexandrovich Kolosov, ulitsa Astrakhanskaya, 118, kv. 54; Jury Egorovich Ivanyatov, ulitsa M. Zatonskaya, 21, and Vera Nikolaevna Kalininskaya, ulitsa Sakko-Vantsetti, 23, kv. 23, all of Saratov, U.S.S.R.

Filed May 11, 1977, Ser. No. 795,880
Int. Cl.² C25D *17/06, 17/08, 17/10*
U.S. Cl. 204—272 **2 Claims**



1. An apparatus for forming cermet electrodes used in alkaline accumulators comprising: an electrolytic tank; a spool disposed in said tank and having wound thereon a counterelectrode and a band stock insulated from each other; the width of said spool being 10 to 15% larger than that of the band stock and the counterelectrode, whereby the band stock and the counterelectrode are axially offset relative to each other during winding, said counterelectrode being formed of a band; the heads of said spool being insulated from each other and formed with openings; and contact terminals being arranged in said openings.

4,116,804

CATALYTICALLY ACTIVE POROUS NICKEL ELECTRODES

Christopher Roderick S. Needes, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 17, 1976, Ser. No. 742,615
Int. Cl.² C25B *11/03, 11/06*
U.S. Cl. 204—284 **8 Claims**

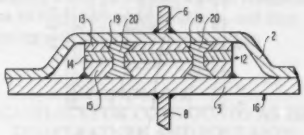
1. An improved electrode for use as a hydrogen-evolution cathode is an electrolytic cell, the electrode being of the type that has a continuous surface layer of active porous Raney nickel in electrical contact with a conductive metal core, the improvement comprising a porous Raney nickel surface layer having a thickness between 100 and 400 microns, an average porosity of at least 11%, and an average agglomerate size of at least 35 microns.

4,116,805

BIPOLAR ELECTRODE

Teruo Ichisaka, and Tadao Ikegami, both of Tamano, Japan, assignors to Chlorine Engineers Corp., Ltd., Tokyo, Japan

Filed Feb. 15, 1978, Ser. No. 878,100
Claims priority, application Japan, Feb. 17, 1977, 52-15501
Int. Cl.² C25B *11/00*
U.S. Cl. 204—290 F **4 Claims**



1. A bipolar electrode comprising

a. an anode member comprising a substrate made of an anticorrosive metal or metal alloy and an electrically conductive coating formed on the surface thereof;

b. a cathode member comprising a metal or a metal alloy;

c. a partition wall for separating the anode member from the cathode member, said partition wall comprising an anode-side sheet made of the same type of anticorrosive metal or metal alloy used as the substrate of said anode member and a cathode-side sheet made of the same type of metal or metal alloy used as the cathode member; and

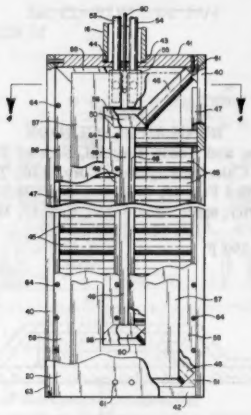
d. a composite member for electrically and structurally connecting the anode member and the cathode member to each other, said composite member comprising bonded together (i) an anode-side portion made of the same type of anticorrosive metal or metal alloy used as the substrate of the anode member, (ii) a cathode-side portion made of the same type of metal or metal alloy used as the cathode member, and (iii), as an interlayer, a portion made of an electrically conductive metal or metal alloy, which is resistant to the migration of hydrogen and is substantially impermeable to atomic hydrogen; wherein (1) pins made of an electrically conductive metal or metal alloy, which is resistant to the migration of hydrogen and is substantially impermeable to atomic hydrogen, are caulk-fitted in through-holes provided in said composite member (*d*) and outwardly diverging toward both surfaces of the composite member (*d*) so that the pins (1) adhere closely to the inside surfaces of the through-holes in the composite member (*d*), (2) the anode-side sheet and the cathode-side sheet of the partition wall (*c*) are sheets having no through-hole for inserting the pins in the composite member, (3) the cathode-side portion of the composite member (*d*) is welded to the surface of the inside of the cathode-side sheet of the partition wall (*c*) in a superimposed state, and (4) the surface of the inside of the anode-side sheet is resistance welded to the top surface of the anode-side portion of the composite member (*d*) in a superimposed state.

4,116,806

TWO-SIDED PLANAR MAGNETRON SPUTTERING APPARATUS

Robert Bruce Love, Upper Arlington, and Alan W. Bowen, Plain City, both of Ohio, assignors to Battelle Development Corporation, Columbus, Ohio

Filed Dec. 8, 1977, Ser. No. 858,656
Int. Cl.[2] C23C *15/00*
U.S. Cl. 204—298 **18 Claims**



1. A two sided planar magnetron cathode comprising a substantially planar frame of substantially symmetric shape formed about a coplanar centerplane,

a plurality of magnets supported within the frame and positioned with the neutral axis of each magnet substantially in the centerplane, and

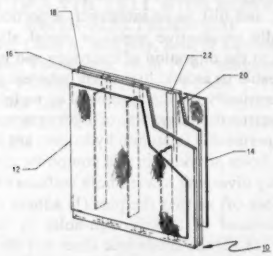
at least one target plate supported on the frame on opposite sides of the centerplane.

4,116,807

EXPLOSION BONDING OF BIPOLAR ELECTRODE BACKPLATES

Edward J. Peters, Chardon, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Division of Ser. No. 761,268, Jan. 21, 1977, Pat. No. 4,055,291. This application Aug. 22, 1977, Ser. No. 826,455
Int. Cl.[2] C25B *11/00*
U.S. Cl. 204—290 F **1 Claim**



1. A bipolar electrode for use in a filter press electrolytic cell comprising: a planar foraminous anode made of titanium bearing upon the surface thereof an electrocatalytically active, corrosive resistant material; a planar solid sheet anode backplate made of titanium connected to said anode in a spaced apart parallel relation; a plurality of solid metallic riser posts made of titanium connecting said anode to said anode backplate in a spaced apart parallel relation; a spaced series of strips of solid metallic electrical conductor made of copper explosion bonded to said anode backplate such that about 10 percent of the total area of said anode backplate is electrically and mechanically connected to said strips of solid metallic electrical conductor; a planar solid sheet cathode backplate having a metallic makeup selected from the group consisting of iron, mild steel, stainless steel and nickel explosion bonded to said spaced series of strips of solid metallic electrical conductor such that about 10 percent of the total area of said cathode backplate is electrically and mechanically bonded to said strips of solid metallic electrical conductor and in a spaced apart parallel relation to said anode backplate leaving a remaining area as a space between said strips of solid metallic electrical conductor to provide a means for hydrogen to vent before it attacks said anode backplate; a planar foraminous cathode having the same metallic makeup as said cathode backplate connected in spaced apart parallel relation to said cathode backplate; and a plurality of solid metallic riser posts having the same metallic makeup as said cathode backplate and said cathode connecting said cathode to said cathode backplate in a spaced apart parallel relation.

4,116,808

PROCESS FOR HYDROGENATING A SOLID CARBONACEOUS MATERIAL WITH Ni/Ti/Mo ON A MAGNESIUM-DEFICIENT MAGNESIUM ALUMINATE SPINEL-AS CATALYST

Donald C. Cronauer, Gibsonia, and William L. Kehl, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 707,521, Aug. 6, 1976. This application Oct. 11, 1977, Ser. No. 840,899
Int. Cl.[2] C10G *1/08*
U.S. Cl. 208—10 **7 Claims**

1. A process for hydrogenating a carbonaceous material which comprises subjecting said carbonaceous material, together with hydrogen, under hydrogenation conditions in the presence of a catalyst comprising a magnesium-deficient magnesium aluminate spinel of the following formula:

$$Mg_xAl_2O_{3+x}$$

wherein x is a number ranging from about 0.10 to about 0.40, carrying nickel, titanium and molybdenum.

4,116,809

DEAERATOR CIRCUIT FOR BITUMEN FROTH

Thaddeus Eugene Kizior, Edmonton, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of Energy, Mines and Resources, Ottawa; Her Majesty the Queen in right of the Province of Alberta, Government of the Province of Alberta, Department of Energy and Natural Resources, Alberta Syncrude Equity, Edmonton; Ontario Energy Corporation; Imperial Oil Limited, both of Toronto; Canada-Cities Service, Ltd., Calgary and Gulf Oil Canada Limited, Toronto, all of, Canada

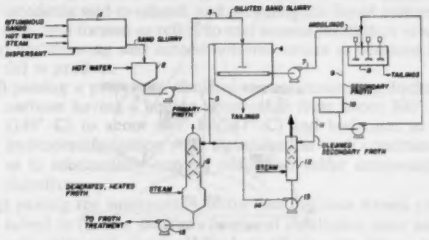
Filed Dec. 2, 1976, Ser. No. 746,669
Claims priority, application Canada, Apr. 27, 1976, 251187
Int. Cl.[2] C10G *1/04*
U.S. Cl. 208—11 LE **1 Claim**

1. In the hot water extraction process for treating tar sand wherein primary and secondary froth streams are produced by a primary separation vessel and a secondary flotation cell, said streams comprising mixtures of bitumen, water and solids, and the streams are transferred to a froth treatment circuit for recovering the bitumen, the improvement which comprises:

directly feeding the secondary froth stream by gravity from a secondary flotation cell to a first deaerator tower and heating and deaerating said stream by passing it countercurrently to steam through said tower;

conveying the deaerated secondary froth stream to a second deaerator tower;

directly feeding the primary froth stream by gravity from a primary separation vessel to the second deaerator tower; passing said streams countercurrently to steam through said second tower to heat and deaerate them to provide a



pumpable deaerated bitumen, water and solids product; and

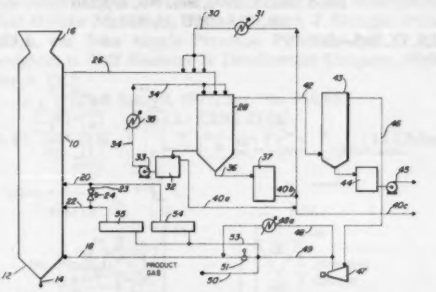
pumping the product with one or more centrifugal pumps to the froth treatment circuit.

4,116,810

INDIRECT HEATING PYROLYSIS OF OIL SHALE

John B. Jones, Jr., and Adam A. Reeves, both of Grand Junction, Colo., assignors to Paraho Corporation, Grand Junction, Colo.

Filed May 24, 1976, Ser. No. 689,505
Int. Cl.[2] C10G *1/02*
U.S. Cl. 208—11 R **5 Claims**



1. A method of retorting oil shale in a closed vertical vessel during an externally heated gas for the pyrolysis of the shale providing an overall efficiency of about 97–100% Fischer Assay recovery of organic carbon comprising:

(a) forming a bed of crushed oil shale in about $a + \frac{1}{2}$ to - 3 inch size consist at a depth of about 24–26 feet ";

(b) feeding ambient temperature crushed shale at a rate of from 300–600 pounds per square foot per hour of cross-section of vessel to the top of the bed and withdrawing retorted shale from the bottom of the bed at a rate to maintain the bed depth;

(c) injecting a first quantity of a non-oxygenous gas into at least one position in said bed at a depth of about 7 feet below the surface of the bed in an amount of about 8,000–12,000 SCF/T at a temperature of about 1,000–1,300° F., said gas being injected in a plurality of jets across the lateral extent of the bed at velocity of less than about 100 feet/sec, and providing from 380 to 440 million BTU per ton of raw shale;

(d) injecting a second quantity of a non-oxygenous cooling gas into the bottom of the bed at temperature of less than about 250° F. and in an amount of 6,000–13,000 SCF/T;

(e) disengaging the resultant products of retorting mixed with the injected gas stream and withdrawing the mixed stream from the vessel.

4,116,811

METHOD OF SEPARATING ACTIVE HYDROGEN COMPOUNDS FROM HETEROGENEOUS MIXTURES ALSO CONTAINING COMPOUNDS WHICH DO NOT CONTAIN ACTIVE HYDROGENS

Hans-Georg Schaefer, Weberhof 17, D-5100 Aachen, and Axel Vogts, Kapellenweg 13, D-5180 Eschweiler, both of Germany

Filed Feb. 4, 1977, Ser. No. 765,681
Int. Cl.[2] C10C *1/20*
U.S. Cl. 208—44 **18 Claims**

1. The method of treating a heterogenous mixture of organic compounds, which mixture comprises at least one organic compound which does not have active hydrogen and at least one other organic compound which does have active hydrogen, which comprises the steps of:

(a) contacting said mixture with a reagent which reacts with said other compound to form a soluble compound, said reagent being selected from the group consisting of alkene oxides and ethyleneimime;

(b) introducing a solvent for said soluble compound into said mixture to form two phases therein; and then

(c) separating said phases from each other.

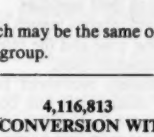
4,116,812

ORGANO-SULFUR COMPOUNDS AS HIGH TEMPERATURE ANTIFOULANTS

Richard L. Godar, and Philip R. Corneli, both of St. Louis, Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Jul. 5, 1977, Ser. No. 813,193
Int. Cl.[2] C10G *9/16;* C08K *5/36;* C10C *7/18*
U.S. Cl. 208—48 AA **5 Claims**

1. A process of inhibiting the adhesion of deposits from hydrocarbons on metallic surfaces of the treating apparatus when said hydrocarbons are treated at elevated temperatures of from about 500° F. to about 1500° F. which comprises adding to said hydrocarbons during the treatment process an inhibiting amount of a heterocyclic organo-sulfur compound of high sulfur content having the formula



where R and R′ which may be the same or different are hydrogen or a substituted group.

4,116,813

HYDROCARBON CONVERSION WITH CRYSTALLINE ZEOLITE ZSM-34

Mae K. Rubin, Bala Cynwyd, Pa.; Edward J. Rosinski, Pedricktown, and Charles J. Plank, Woodbury, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 738,771, Nov. 4, 1976, Pat. No. 4,086,186. This application Nov. 16, 1977, Ser. No. 852,167
Int. Cl.[2] C10G *11/04;* B01J *8/24;* C01B *29/28*
U.S. Cl. 208—46 **9 Claims**

1. A process for converting a hydrocarbon charge which comprises contacting said hydrocarbon charge, under hydrocarbon conversion conditions, with a catalyst comprising a zeolite or thermal decomposition product thereof, which zeolite has a composition, as synthesized and in anhydrous form, in terms of mole ratios of oxides as follows:

$$(0.5\text{–}1.3)R_2O : (0\text{–}0.15\ Na_2O) : (0.10\text{–}0.50)K_2O : Al_2O_3 : X\ SiO_2$$

where R is the organic nitrogen-containing cation derived

from choline and X is 8 to 50, said zeolite being characterized by:

(1) an X-ray diffraction pattern set forth in Table 1 of the specification; and

(2) the capability, after calcination at 1000° F for at least a time to remove the organic cation, of sorbing at least 9.5 weight percent of n-hexane at ambient temperature and a n-hexane pressure of 20 mm.

4,116,814

METHOD AND SYSTEM FOR EFFECTING CATALYTIC CRACKING OF HIGH BOILING HYDROCARBONS WITH FLUID CONVERSION CATALYSTS

John C. Zahner, Princeton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 18, 1977, Ser. No. 816,849

Int. Cl.[2] B01J *8/24;* C10G *11/04, 37/02*

U.S. Cl. 208—78 **16 Claims**

1. In a process for converting hydrocarbons with fluid particles of catalyst and regenerating the catalyst particles by burning carbonaceous deposits on the catalyst in an adjacent catalyst regeneration thereby heating the catalyst particles to an elevated temperature before recycle to said hydrocarbon conversion operation, the improvement which comprises

providing at least two separate catalyst conversion zones for processing hydrocarbon fractions of different boiling range and coke producing characteristics,

converting a low coke producing first hydrocarbon fraction in the presence of a first mass of active crystalline zeolite fluid particles of catalyst of selected activity and physical characteristics under elevated temperature conversion conditions,

converting a second hydrocarbon fraction of higher coke producing characteristics in the presence of a second mass of active crystalline zeolite fluid particles of physical characteristics different from said first catalyst mass,

recovering catalyst particles from each of said conversion operations comprising different amounts of carbonaceous deposits of said conversion, recovering hydrocarbon conversion products of each of said hydrocarbon conversion operations,

passing said recovered catalyst comprising catalyst of said first and second mass of catalyst particles in admixture with one another into a catalyst regeneration under conditions selected to heat said mixture of particles of catalyst to an elevated temperature above 1200° F. by burning said carbonaceous deposits, separating by elutriation in said regeneration zone said first mass of fluid particles from said second mass of fluid particles,

recovering one of said catalyst masses from an upper portion of the regeneration zone and the other from a lower portion of the regeneration zone,

recycling the separately recovered regenerated first and second mass of catalysts to the conversion zone from which obtained and recycling a portion of one of said first and second mass of catalyst particles recovered from said regeneration zone to said catalyst regeneration operation for admixtures with particles of catalyst containing carbonaceous deposits being regenerated in said catalyst regeneration operation.

4,116,815

PROCESS FOR PREPARING NEEDLE COAL PITCH COKE

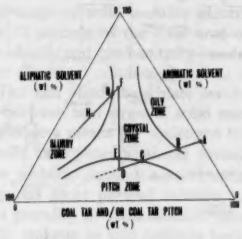
Hirofumi Sunago, Kitakyushu, and Wataru Migitaka, Kawasaki, both of Japan, assignors to Nittetsu Chemical Industrial Co., Ltd., Tokyo, Japan

Filed Jun. 21, 1977, Ser. No. 808,775

Int. Cl.[2] C10G *9/14*

U.S. Cl. 208—87 **15 Claims**

1. A process for preparing needle coke which comprises mixing (1) coal tar, coal tar pitch or a mixture thereof with (2) an aromatic solvent and (3) an aliphatic solvent at atmospheric pressure and a temperature between 15° and 140° C., the mixing ratio among the aromatic solvent, the aliphatic solvent and the coal tar, coal tar pitch or mixture thereof being adjusted so that quinoline insoluble substances precipitate in a zone selected from the group consisting of a slurry zone and a crystal



zone, separating the precipitated substances from the resultant mixture to obtain a supernatant, distilling the supernantant to obtain, as a distillation residue, hydrocarbons consisting substantially of aromatic compounds, said hydrocarbons being substantially free of quinoline insoluble substances, and coking the distillation residue to produce coke.

4,116,816

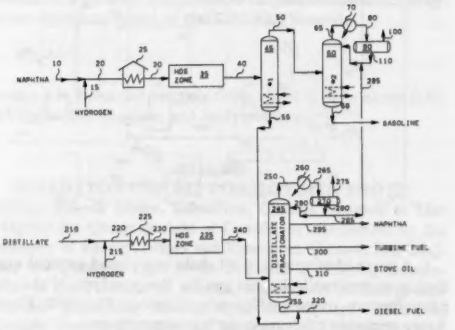
PARALLEL HYDRODESULFURIZATION OF NAPHTHA AND DISTILLATE STREAMS WITH PASSAGE OF DISTILLATE OVERHEAD AS REFLUX TO THE NAPHTHA DISTILLATION ZONE

Edgar D. Davis, and Gilbert L. Colbert, both of Borger, Tex., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 1, 1977, Ser. No. 773,236

Int. Cl.[2] C10G *23/00*

U.S. Cl. 208—209 **1 Claim**



1. A process for the production of sulfur-free oil fractions from separate naphtha and distillate streams, said process having separate naphtha and distillate hydrodesulfurization steps, which comprises:

(a) passing a preheated naphtha stream comprising hydrocarbons having boiling points between about 160° F (71° C) and about 480° F (249° C), and hydrogen to a hydrodesulfurization zone and therein subjecting said naphtha stream to such hydrodesulfurization conditions as to substantially remove sulfur and sulfur compounds present therein;

(b) passing substantially sulfur-free naphtha stream obtained in (a) to a first fractional distillation zone and subjecting same to such distillation conditions including temperature and pressure as to separate a first naphtha overhead and a first heavy bottoms fraction boiling in the range of about 300–530° F;

(c) withdrawing said naphtha overhead obtained in (b) and

passing same to a second fractional distillation zone and therein subjecting the stream to such distillation conditions which result in separation of the stream into a second naphtha overhead and a second bottoms stream comprising gasoline boiling range hydrocarbons;

(d) cooling said second naphtha overhead sufficiently to condense said overhead, and recycling the liquid condensate thus formed as reflux to said second distillation zone;

(e) withdrawing said second bottoms stream as obtained in (c) as product;

(f) passing a preheated distillate stream comprising hydrocarbons having a boiling point range from about 300° F (149° C) to about 620° F (327° C) and hydrogen to a hydrodesulfurization zone maintained at such conditions as to substantially remove sulfur and sulfur compounds therefrom;

(g) passing the substantially sulfur-free distillate stream obtained in (f) to a distillate fractional distillation zone and subjecting said stream to such distillation conditions including temperature and pressure as to separate the stream into a distillate overhead boiling in the range of about 215°–400° F, intermediate cuts, and a heavy distillate bottoms boiling in the range of about 350–650° F;

(h) blending the first heavy bottoms fraction obtained in (b) with the heavy distillate bottoms obtained in (g) as a fuel product boiling in the range of about 320–625° F;

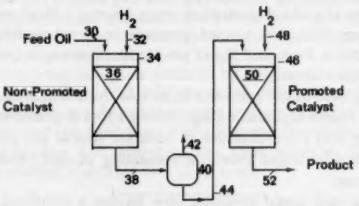
(i) withdrawing the intermediate cuts from step (g) as products, and;

(j) passing a portion of said distillate overhead obtained in step (g) to the liquid condensate reflux stream in (d).

4,116,817
HYDRODESULFURIZATION PROCESS EMPLOYING A PROMOTED CATALYST

James Albert Frayer, Pittsburgh; Henri K. Lese, Monroeville; Joel Drexler McKinney, Pittsburgh; Kirk J. Metzger, Pittsburgh, and John Angelo Paraskos, Pittsburgh, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Jun. 28, 1977, Ser. No. 810,857
Int. Cl.[2] C10G *23/02*
U.S. Cl. 208—210 **13 Claims**

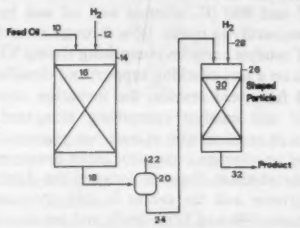


1. In a process for the hydrodesulfurization of an asphaltene-containing oil containing sulfur and metals at a hydrogen pressure between 1,000 and 5,000 psi and a temperature between 600° and 900° F., wherein said oil and hydrogen are passed downwardly in trickle flow through upstream and downstream beds of catalyst particles in series, wherein said catalyst particles in said downstream catalyst bed comprises Group VI and Group VIII metals together with a promoting amount comprising between about 1 and 10 weight percent based on total catalyst weight of Group IV-B metal on a non-cracking support and wherein the catalyst in said upstream catalyst bed comprises Group VI and Group VIII metals on a non-cracking support without said promoting amount of Group IV-B metal, the invention comprising the particles of said promoted catalyst in said downstream bed comprising elongated extrudates which show in cross-section at least one groove defining protrusions and an average concavity index between about 1.01 and 1.35, the shortest distance between the depth of said at least one groove and the center in said cross-section being between about 1/30 and 1/120 inch, said grooving of the promoted catalyst particles allowing a given amount of desulfurization of said oil at a lower temperature as compared with the temperature required for a similar downstream catalyst which is not provided with said grooves, and said temperature in said downstream reactor increasing with increasing catalyst age at a lower rate than the rate of temperature increase for a similar downstream catalyst which is not provided with said grooves.

4,116,818
MULTI-REACTOR HYDRODESULFURIZATION PROCESS

James Albert Frayer, Pittsburgh; Henri K. Lese, Monroeville; Joel Drexler McKinney, Pittsburgh; Kirk J. Metzger, Pittsburgh, and John Angelo Paraskos, Pittsburgh, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Jun. 28, 1977, Ser. No. 811,135
Int. Cl.[2] C10G *23/02*
U.S. Cl. 208—210 **4 Claims**

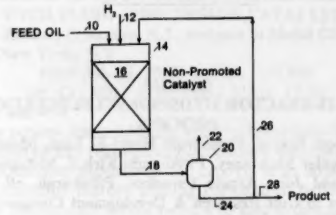


1. In a process for the hydrodesulfurization of an asphaltene-containing oil containing sulfur and metals at a hydrogen pressure between 1,000 and 5,000 psi and a temperature between 600° and 900° F. wherein said oil and hydrogen are passed downwardly in trickle flow through upstream and downstream reactors in series, wherein said catalyst in the downstream reactor comprises Group VI and Group VIII metals together with a promoting amount comprising between about 1 and 10 weight percent based on total catalyst weight of Group IV-B metal on a non-cracking support and wherein the catalyst in the upstream reactor comprises Group VI and Group VIII metals on a non-cracking support without said promoting amount of Group IV-B metal, the invention comprising the mass velocity of said oil in said downstream reactor being higher than the mass velocity of said oil in said upstream reactor, the particles of said promoted catalyst in said downstream reactor comprising elongated extrudates which show in cross-section at least one groove defining protrusions and an average concavity index between about 1.01 and 1.35, the shortest distance between the depth of said at least one groove and the center in said cross-section being between 1/30 and 1/120 inch, said grooving of the promoted catalyst particles allowing a given amount of desulfurization of said oil at a lower temperature as compared with the temperature required for a similar downstream catalyst which is not grooved, with said temperature in said upstream reactor and said temperature in said downstream reactor increasing with increasing catalyst age, and with said temperature increase in said downstream reactor being lower at said higher oil mass velocity of the downstream reactor than the temperature increase at the oil mass velocity of the upstream reactor.

4,116,819
HYDRODESULFURIZATION PROCESS INCLUDING PRODUCT RECYCLE

James Albert Frayer, Pittsburgh; Henri K. Lese, Monroeville; Joel Drexler McKinney, Pittsburgh; Kirk J. Metzger, Pittsburgh, and John Angelo Paraskos, Pittsburgh, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Jun. 28, 1977, Ser. No. 810,860
Int. Cl.[2] C10G 23/02
U.S. Cl. 208—216 21 Claims



1. In a process of the hydrodesulfurization of an asphaltene-containing oil containing sulfur and metals at a hydrogen pressure between 1,000 and 5,000 psi and a temperature between 600° and 900° F. wherein said oil and hydrogen are passed downwardly in trickle flow through a reactor containing a bed of catalyst particles comprising Group VI and Group VIII metals on a non-cracking support and desulfurized liquid is removed from said reactor, the invention comprising the particles of said catalyst comprising elongated extrudates which show in cross-section at least one groove defining protrusions and an average concavity index between about 1.01 and 1.35, the shortest distance between the depth of said at least one groove and the center in said cross-section being between about 1/30 and 1/120 inch, and increasing the liquid mass velocity in said reactor by recycling a portion of said liquid product to said reactor to accomplish a given amount of desulfurization at a lower temperature than would be required without said product recycle.

4,116,820
PROCESS FOR DEMETALLIZING OF HEAVY HYDROCARBONS

George C. Blytas, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

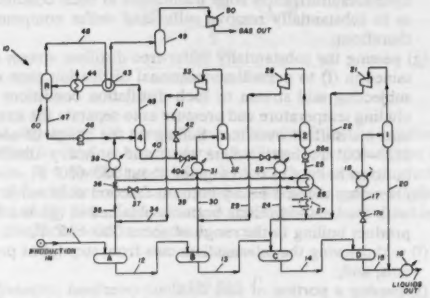
Filed Jun. 29, 1977, Ser. No. 811,235
Int. Cl.[2] C10G 17/00
U.S. Cl. 208—251 R 6 Claims

1. A process for demetallizing heavy hydrocarbon tocks which comprises contacting said stocks at a temperature in the range from about 370° to 450° C. with a sorbent consisting essentially of particulate active carbon having at least a majority of its pore volume in pores having a diameter greater than 0.9 nm, which sorbent has previously been oxidized by contact with a highly acidic oxidizing fluid and substantially separated from said oxidizing fluid.

4,116,821
METHOD AND APPARATUS FOR PROCESSING A PETROLEUM PRODUCTION STREAM

Alfred M. Peiser, Rocky Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 709,488, Jul. 28, 1976, abandoned, which is a continuation-in-part of Ser. No. 684,507, May 7, 1976, abandoned. This application Oct. 20, 1977, Ser. No. 844,010
Int. Cl.[2] C10G 7/00
U.S. Cl. 208—361 8 Claims



1. A method of processing a petroleum production stream to produce a liquid product having a stabilized vapor pressure, said method comprising:

passing the production stream into a first separation stage having a first pressure to separate first gas products from liquid products in said production stream;

passing said liquid products from said first separation stage to a second separation stage having a second pressure lower than said first pressure to separate second gas products from said liquid products remaining in said production stream;

passing said liquid products from said second separation stage to a third separation stage having a third pressure lower than said second pressure to separate third gas products from said liquid products remaining in said production stream;

passing said liquid products from said third separation stage to a fourth separation stage having a fourth pressure lower than said third pressure to separate fourth gas products from said liquid products remaining in said production stream;

passing said liquid products now having a stabilized vapor pressure from said fourth separation stage to a utilization source;

passing said fourth gas products from said fourth separation stage to a first gas separator to condense first condensed liquid products from said fourth gas products;

passing the gas products from said first gas separator back to said third separation stage;

passing the gas products from said third separation stage to a second gas separator to condense second condensed liquid products from said gas products;

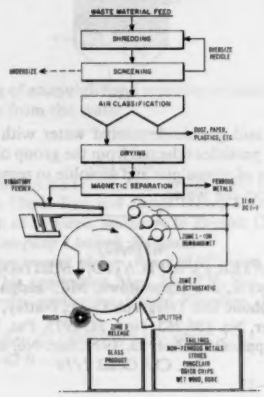
returning said second condensed liquid products from said second gas separator to said third separation stage; and

controlling said stabilized vapor pressure of said liquid products leaving said fourth separation stage by controlling both (1) the temperature at which said liquid products leave said third separation stage by supplying heat to said second condensed liquid products before said products enter said third separation stage and (2) the pressure in said fourth separation stage.

4,116,822
METHOD OF SELECTIVELY SEPARATING GLASS FROM WASTE MATERIAL

Clyde B. Webb, Jacksonville, Fla., assignor to Carpco, Inc., Jacksonville, Fla.

Continuation of Ser. No. 476,296, Jun. 4, 1974, abandoned. This application Jun. 30, 1976, Ser. No. 701,203
Int. Cl.[2] B03B 1/02
U.S. Cl. 209—11 16 Claims



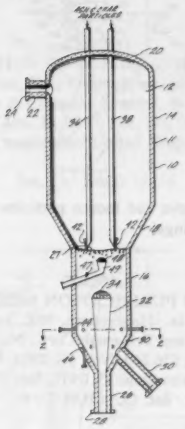
1. A method of separating glass particles from waste material comprising the steps of:
(a) sizing the waste material to a particle size greater than ¼ inch and less than 1¼ inches;
(b) subjecting the waste material to preliminary classification to remove low bulk density material and reducing the moisture content of the waste material to less than 2%;
(c) pinning the glass particles to a grounded electrode comprising a metal drum having a diameter between about 14 and about 36 inches rotating at a rate lying in a range from about 8 to about 25 rpm by feeding the waste material in contact with said grounded electrode at a rate between 50 and 150 pounds per hour per inch of grounded electrode length through a first zone wherein the waste material is subjected to ion bombardment from at least one ionizing D.C. corona discharge electrode;
(d) removing non-glass particles by passing the waste material in contact with said grounded metal electrode into a second zone wherein the waste material is subjected to an electrostatic field from a non-ionizing electrode; and
(e) releasing and collecting the glass particles from said grounded electrode in a third zone.

4,116,823
VESSEL FOR STRIPPING OIL FROM FLUIDIZED ASH AND CHAR PARTICLES

Charles K. Choi, Claremont, Calif., assignor to Occidental Petroleum Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 603,874, Aug. 11, 1975, abandoned. This application Aug. 31, 1976, Ser. No. 719,274
Int. Cl.[2] B07B 9/02
U.S. Cl. 209—44 12 Claims

1. Apparatus for collecting particles of different densities, stripping said particles of entrained fluids and providing a mixture of said collected particles for feed to another apparatus, which comprises:
(a) a housing providing an elongated vertical chamber having an upper end including a top and a lower end;
(b) at least one particles inlet conduit extending from said top downward into the chamber terminating at a point of discharge within the chamber, said particles inlet conduit for transferring particles collected external of the chamber downward to and into the chamber to form a bed of particles extending from said lower end to said point of discharge;
(c) a gas exhaust outlet at the upper end of the chamber;
(d) means for directing a flow of gas from said lower end through the contained bed of particles to fluidize said particles and strip said particles of entrained fluid;
(e) means included on said particles inlet for preventing flow of particles and gas upwards in said conduit;
(f) a first particles outlet conduit extending from the lower end of said chamber upward to a point of particles removal intermediate between said lower end and said point of discharge and providing at said point of particles removal, an opening for receiving a mixture of said particles of different densities;



(g) valve means associated with said particles outlet conduit for controlling the level of the bed of particles contained in the chamber; and
(h) a second particles outlet conduit extending from the side of said chamber to a point between said point of particles removal and said point of discharge and providing a second opening for receiving particles.

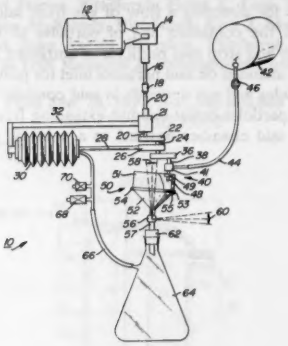
4,116,824
AUTOMATED WET SIEVING APPARATUS

Rozalija Somkaite, South Orange, and Bela Toth, New Providence, both of N.J., assignors to Armour Pharmaceutical Company, Phoenix, Ariz.

Filed Nov. 12, 1976, Ser. No. 741,327
Int. Cl.[2] B07B 1/46
U.S. Cl. 209—262 9 Claims

1. An automated wet sieving apparatus comprising:
(a) distributing means for supplying wetting liquid to a sieve containing particles to be sieved;
(b) eccentric drive means connected to said distributing means for driving said distributing means in an orbital path about a vertical axis generally perpendicular to and generally in the center of said sieve; and
(c) vacuum and pressure creating means actuated by said

eccentric drive means for alternately creating vacuum and pressure below the sieves, to draw undersized particles



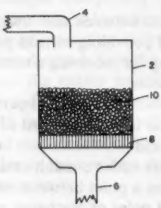
through the sieve and loosen particles which may blind the sieve openings.

4,116,825

WATER PURIFICATION METHODS

Edgar W. Sawyer, Jr., Hagerstown, Md., assignor to International Telephone and Telegraph Corp., Nutley, N.J.

Division of Ser. No. 636,263, Nov. 28, 1975, Pat. No. 4,054,515.
This application Jun. 13, 1977, Ser. No. 806,201
Int. Cl.[2] C02B *1/14*
U.S. Cl. 210—27 16 Claims



12. A method for purifying contaminated water containing hormones comprising the steps of:

treating said water by adding a flocculating chemical to coagulate and settle at least part of said hormones from said water;

filtering said treated water to remove a further part of said hormones;

treating said filtered water with a chemical germicide to kill bacteria; and

contacting said germicide-treated water with large surface area clay particles selected from the group of natural clays consisting of attapulgite and sepiolite to remove remaining hormones from the water.

4,116,826

WATER PURIFICATION METHODS

Edgar W. Sawyer, Jr., Hagerstown, Md., assignor to International Telephone and Telegraph Corp., Nutley, N.J.

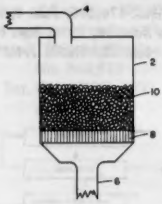
Division of Ser. No. 636,263, Nov. 28, 1975, Pat. No. 4,054,515.
This application Jun. 13, 1977, Ser. No. 806,202
Int. Cl.[2] C02B *1/14*
U.S. Cl. 210—27 14 Claims

11. A method for purifying contaminated water containing toxins comprising the steps of:

treating said water by adding a flocculating chemical to coagulate and settle at least part of said toxins from said water;

filtering said treated water to remove a further part of said toxins;

treating said filtered water with a chemical germicide to kill bacteria; and



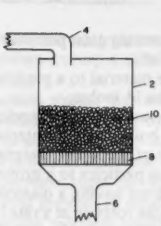
contacting said germicide-treated water with large surface area clay particles selected from the group of natural clays consisting of attapulgite and sepiolite to remove remaining toxins from the water.

4,116,827

WATER PURIFICATION METHODS

Edgar W. Sawyer, Jr., Hagerstown, Md., assignor to International Telephone and Telegraph Corp., Nutley, N.J.

Division of Ser. No. 636,263, Nov. 28, 1975, Pat. No. 4,054,515.
This application Jun. 13, 1977, Ser. No. 806,250
Int. Cl.[2] C02B *1/14*
U.S. Cl. 210—27 18 Claims



15. A method for purifying contaminated water containing viruses comprising the steps of:

treating said water by adding a flocculating chemical to coagulate and settle at least part of said viruses from said water;

filtering said treated water to remove a further part of said viruses;

treating said filtered water with a chemical germicide to kill bacteria; and

contacting said germicide-treated water with large surface area clay particles selected from the group of natural clay consisting of attapulgite and sepiolite to remove remaining viruses from the water.

4,116,828

WATER PURIFICATION METHODS

Edgar W. Sawyer, Jr., Hagerstown, Md., assignor to International Telephone and Telegraph Corp., Nutley, N.J.

Division of Ser. No. 636,263, Nov. 28, 1975, Pat. No. 4,054,515.
This application Jun. 13, 1977, Ser. No. 806,251
Int. Cl.[2] C02B *1/14*
U.S. Cl. 210—27 16 Claims

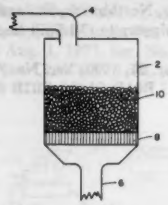
11. A method for purifying contaminated water containing pesticides comprising the steps of:

treating said water by adding a flocculating chemical to coagulate and settle at least part of said pesticides from said water;

filtering said treated water to remove a further part of said pesticides;

treating said filtered water with a chemical germicide to kill bacteria; and

contacting said germicide-treated water with large surface area clay particles selected from the group of natural clays



consisting of attapulgite and sepiolite to remove remaining pesticides from the water.

4,116,829

MAGNETIC SEPARATION, METHOD AND APPARATUS

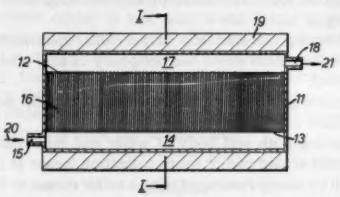
Norman Owen Clark, Par, and James Henry Peter Watson, St. Austell, both of England, assignors to English Clays Lovering Pochin & Company Limited, England

Continuation-in-part of Ser. No. 540,977, Jan. 14, 1975, abandoned. This application Mar. 29, 1976, Ser. No. 671,723

Claims priority, application United Kingdom, Jan. 18, 1974, 2543/74

Int. Cl.² B01D *17/06*; B03C *1/02*

U.S. Cl. 210—42 S **17 Claims**



15. A method of separating magnetisable particles from a fluid in which they are suspended, which method comprises:

(a) establishing a high intensity magnetic field in a matrix of a plurality of ferromagnetic filaments each filament of a diameter of less than 250 microns said filaments being arranged substantially parallel to one another in a first direction perpendicular to the direction of the magnetic field;

(b) passing fluid containing magnetisable particles in suspension therein through the ferromagnetic matrix generally in said first direction, whereby the magnetisable particles are magnetised by the magnetic field and attracted to and retained on the filaments of the matrix; and

(c) removing the magnetisable particles retained on the ferromagnetic matrix.

4,116,830

METHOD OF TREATING WET-WASHED SILICA DUST

Harald Krogsrud, Gjettum, Norway, assignor to Elkem-Spigerverket A/S, Oslo, Norway

Filed Apr. 22, 1977, Ser. No. 789,865

Claims priority, application Norway, Apr. 23, 1976, 761383

Int. Cl.² C02C *5/06*

U.S. Cl. 210—63 R **5 Claims**

1. A process for treating the waste gasses generated from metallurgical furnaces for the production of materials high in silicon content comprising:

(a) wet-washing the waste gasses whereby a sludge is obtained comprising silica dust, phenols and cyanides;

(b) introducing the sludge to a rotary kiln;

(c) heating the sludge at temperatures not in excess of about 500° C. until substantially all of the water is driven off from the sludge;

(d) thereafter raising the temperature of the sludge in the rotary kiln to from about 800° C. to about 1,400° C. while simultaneously treating it with an agent selected from the group consisting of those oxidizing and reducing agents capable of rendering phenols and cyanides harmless;

(e) continuing the heating of step (d) until a substantial portion of the phenols and cyanides are rendered harmless;

(f) and wherein pellets comprising silica dust are formed by the rotary action of the rotary kiln at the elevated temperatures of step (d).

4,116,831

SEPARATION OF SOLIDS AND LIQUIDS

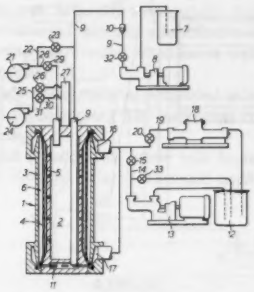
Gordon Samuel Keat, Par, England, assignor to English Clays Lovering Pochin & Company Limited, St. Austell, England

Filed Jan. 25, 1977, Ser. No. 762,250

Claims priority, application United Kingdom, Jan. 29, 1976, 3647/76

Int. Cl.² B01D *33/36*

U.S. Cl. 210—68 **3 Claims**



1. A method of reducing the liquid content of a mixture of a liquid and a particulate solid, which method comprises feeding a slurry of said mixture into the inner compartment of a tube pressure filter in an amount sufficient to fill said compartment; said tube pressure filter comprising an arragnement of a pair of generally coaxial tubular assemblies arranged one within the other, (b) an impermeable elastic sleeve disposed within and secured to the outer of said tubular assemblies, (c) a filter element disposed around and supported by the inner of said tubular assemblies, (d) first dishcarge means for the discharge of filtrate which has passed through the filter element, and (e) second discharge means for the discharge of solid material retained on said filter element, the arrangement being such that in a first operating condition of the tube pressure filter said second discharge means is closed and the tubular assemblies cooperate with each other to define a closed annular chamber which is divided into generally coaxial and non-intercommunicating inner and outer compartments by said impermeable elastic sleeve, the inner compartment having an inlet for a feed slurry comprising a mixture of liquid and a particulate solid and the outer compartment having an inlet for a hydraulic fluid under pressure, and in a second operating condition of the tube pressure filter the second discharge means is open to enable particulate solid in the form of a filter cake to be discharged from the inner compartment; introducing hydraulic fluid into the outer compartment of said tube pressure filter to cause the elastic sleeve to expand towards the inner tubular assembly of the tube pressure filter, thereby to force liquid through the filter element of the tube pressure filter and form on the filter element a filter cake of the particulate solid; thereafter withdrawing the hydraulic fluid from the outer compartment whilst simultaneously introducing into the inner compartment of the tube pressure filter a gas at a pressure ranging from about

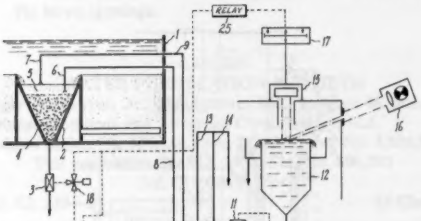
30 to about 100 p.s.i.g.; whereby cracking of the filter cake is prevented; and thereafter increasing the pressure applied to the gas to a value necessary for it to be forced through the pores of the filter cake by again supplying to said outer compartment hydraulic fluid under a pressure ranging from about 500 to about 2,000 p.s.i.g. thereby causing the elastic sleeve to expand towards said inner tubular assembly, to compress the gas and force it through the pores of the filter cake.

4,116,832

METHOD AND MEANS FOR THE AUTOMATIC REGULATION OF SLUDGE EXTRACTION IN SEWAGE TREATMENT APPARATUS

Jacques Tardivel, Plaisir, France, assignor to Degremont, Rueil-Malmaison, France

Filed Oct. 19, 1976, Ser. No. 733,938
Claims priority, application France, Nov. 6, 1975, 75 33927
Int. Cl.² B01D *21/24*
U.S. Cl. 210—83 **9 Claims**



1. A process for automatically extracting accumulated sludge from a sludge concentrator employed in a sludge-bed sewage treatment system, wherein said concentrator has in a lower portion thereof accumulated sludge and above said sludge a liquid region of vertically variable turbidity, the turbidity of said region gradually increasing as said sludge accumulates in said concentrator, and said turbidity of said region gradually decreasing as sludge is extracted from said concentrator, said process comprising:

continually taking a first sample of the liquid in said region at a first vertical level therein;

continuously taking a second sample of the liquid in said region at a second vertical level therein, said level being higher than said first level;

alternately passing one of said first and second liquid samples to a vessel positioned separately from said concentrator, while passing the other of said first and second liquid samples to an overflow;

continuously measuring the turbidity of the liquid in said vessel, to thereby continuously obtain a measurement of the turbidity of said region; and

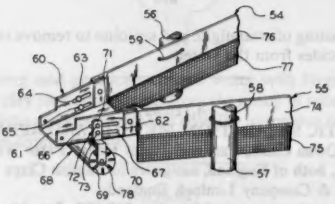
controlling, as a function of said turbidity measurement, extraction of accumulated sludge from said concentrator and which of said first and second samples is passed to said vessel, such that when said turbidity measurement reaches a determined maximum value sludge is extracted from said concentrator and said first sample is passed to said vessel, whereafter said turbidity measurement will decrease, and such that when said turbidity measurement reaches a determined minimum value extraction of said sludge is stopped and said second sample is passed to said vessel, whereafter said turbidity measurement will increase.

4,116,833

METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM BODIES OF WATER

Merlin D. Stagemeyer, Northbrook, Ill., and Seth Ford Allcorn, Columbia, Mo., assignors to Oil Spill Recovery, Inc., Northbrook, Ill.

Filed Mar. 21, 1977, Ser. No. 779,638
Int. Cl.² B01D *21/24;* E02B *15/04*
U.S. Cl. 210—83 **19 Claims**



1. A method for removing petroleum and other spilled contaminant material from the surface of body of water, while at the same time recovering said petroleum or other contaminant in its original form for reuse or reprocessing, said method comprising:

a. positioning substantially impervious open-ended main barricade means about the periphery of said contaminant material;

b. channeling said contaminant towards one or more contaminant collection areas;

c. skimming both said body of water and said contaminant material at said one or more collection means at a desired depth by scoop means; rotating a roller means at the scoop means to aid in positioning the scoop means and in inducing flow through said scoop means;

d. separating said contaminant material from said water so as to isolate said contaminant material, and

e. directing said isolated contaminant material to contaminant retention means through which said contaminant material may be contained for said reuse and reprocessing.

6. A system for removing and recovering contaminant material from the surface of a body of water comprising:

open-ended apron channeling means maintained afloat in said body of water by apron buoys,

said apron channeling means restrainably attached to collection means so as to converge thereto,

said apron channeling means being impervious to said contaminant material;

said collection means including scoop means for skimming said contaminant material from the surface of said body of water as said contaminant material is directed to said collection means by said apron channeling means;

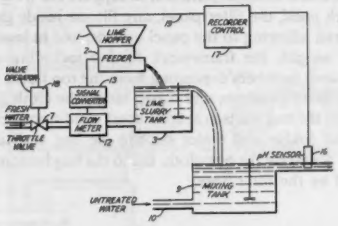
material transport means operably attached to said collection means for removing said contaminant material from said collection means; and

system activation means for initiating movement between said system and said body of water to channel said contaminant material to said collection means and to activate said skimming, said scoop means including a rotatable roller means having fins thereon for inducing rotation of said roller means when the body of water has relative movement to said scoop means to aid in positioning said scoop means relative to said apron channeling means and to induce flow of water and contaminant material into said scoop means.

4,116,834
APPARATUS FOR INCREASING THE PH OF WASTE WATER

Earle Cochran King, Evans City, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Aug. 1, 1977, Ser. No. 820,887
Int. Cl.[2] C02B 1/18, 1/30
U.S. Cl. 210—96 R 1 Claim

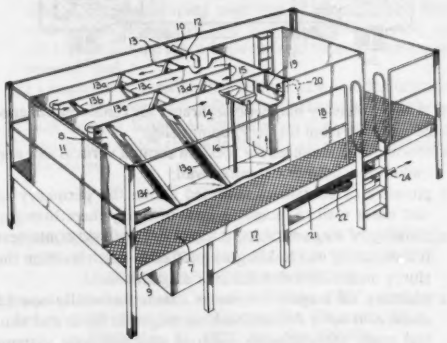


1. Apparatus for increasing the pH of waste water, comprising a lime water having an outlet, a lime slurry tank having an inlet for water and an overflow outlet, a conduit for delivering water to said slurry tank inlet, a throttle valve in said conduit, a flowmeter in the conduit for measuring the rate of flow therethrough, variable feed means for feeding lime from said hopper outlet to said slurry tank, a mixing tank having an inlet for untreated waste water and an outlet for treated waste water, said mixing tank being positioned to receive slurry from said overflow outlet to mix with waste water in the mixing tank, a sensor responsive to the pH of treated waste water leaving the mixing tank, means controlled by said sensor for operating said throttle valve, and means controlled by the flowmeter for operating said variable feed means to keep the concentration in said slurry tank substantially constant regardless of the rate of flow out of that tank.

4,116,835
POLLUTION CONTROL SYSTEM

Alexander Bruno Bertelson, Tinton Falls, N.J., assignor to Savage Technical Services, Inc., Clark, N.J.

Filed Apr. 8, 1977, Ser. No. 785,789
Int. Cl.[2] B01D 29/08
U.S. Cl. 210—100 6 Claims



1. A unitary apparatus for removing hydrocarbons and other contaminants from aqueous effluents, comprising,

a. a unitary tank having a bottom and substantially vertical side and end walls;

b. a first vertically disposed wall adapted and constructed to divide said tank into a separation zone and an extraction zone;

c. said separation zone having at least one vertical baffle having one vertical end connected to a wall and the other end in spaced relationship to an opposite wall and adapted and constructed to provide a tortuous horizontal flow path for said aqueous effluents;

d. an aqueous effluent entrance orifice at substantially one end of said flow path of said separation zone;

e. at least one foraminous web positioned to interrupt said flow path extending from substantially said bottom upwardly at an angle in a direction against said flow path;

f. said foraminous web being constructed of an oleophilic material whereby said hydrocarbons coalesce into droplets on said foraminous web and then accumulate on the surface of said effluent;

g. skimmer means positioned near the other end of said flow path of said separation zone whereby said accumulated hydrocarbon is removed from said effluent;

h. said tank having a horizontally disposed member substantially coextensive with said separating zone adapted and constructed to form a reservoir for said hydrocarbon material between said bottom and said separating zone;

i. means for fluidly connecting said skimmer and said reservoir whereby hydrocarbons are discharged from said skimmer into said reservoir;

j. means fluidly connecting said separation zone and said extraction zone whereby substantially hydrocarbon free effluent is charged into said extraction zone;

k. a horizontally positioned foraminous web dividing said extraction zone;

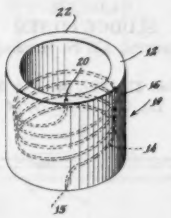
l. a mass of adsorbing material positioned below said foraminous web for adsorbing any additional contaminants in said effluent;

m. and means in said tank below said foraminous web to discharge cleansed effluent from said tank.

4,116,836
CHROMATOGRAPHIC COLUMN

William M. DeAngelis, Wilton, Conn., assignor to Henry Allen, Mamaroneck and Charles J. Garbarini, Jr., New York, both of, N.Y.

Filed Mar. 1, 1977, Ser. No. 773,325
Int. Cl.[2] B01D 15/08
U.S. Cl. 210—198 C 22 Claims



1. A packed chromatographic column comprising a glass monolithic construction having at least one pair of opposed surfaces and solid glass therebetween;

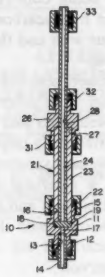
A continuous passageway of essentially constant diameter adapted to receive a fluid therethrough contained wholly within said solid glass between said opposed surfaces of said monolithic contruction, the passageway having an inlet and an outlet opening in at least one of said opposed surfaces, and

chromatographic packing material in said passageway for separating the components of a fluid sample introduced into and flowing through said passageway from said inlet to said outlet.

4,116,837
HIGH PRESSURE LIQUID CHROMATOGRAPHY APPARATUS

John J. Biermacher, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Jan. 12, 1978, Ser. No. 869,020
Int. Cl.[2] B01D *15/08*
U.S. Cl. 210—198 C 8 Claims

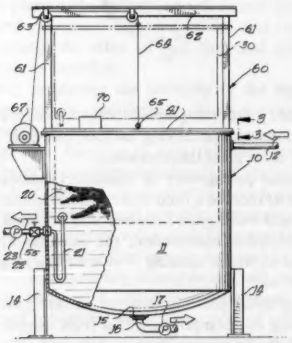


1. A high pressure liquid chromatography apparatus comprising a sample injection valve; a first tube of relatively small external diameter leading from said sample injection valve; an inline filter comprising a body having a first recess of relatively small diameter, the adjacent end of said first tube being received in said first recess, and a first tube fitting releasably sealingly securing said adjacent end of said first tube in said first recess, said body having a second recess of relatively large diameter, a bore extending between the adjacent inner ends of said first and second recesses, a filter element seated on the inner end of said second recess and covering the adjacent end of said bore, a tubular conduit having one end thereof extending into said second recess and into abutting contact with said filter element, and a second tube fitting for releasably sealingly securing said one end of said tubular conduit in said second recess; and a liquid chromatography column having an inlet releasably sealingly connected to the other end of said tubular conduit, the internal diameters of said first tube and said tubular conduit and the diameter of said bore being substantially the same so as to define a flow passage of essentially the same diameter throughout its entire length with said flow passage being interrupted only by said filter element.

4,116,838
SLUDGE FILTER

Thomas Frank Lazzarotto, 320 N. Harding Ave., Chicago, Ill. 60624

Filed Jul. 27, 1977, Ser. No. 819,292
Int. Cl.[2] B01D *29/14*
U.S. Cl. 210—209 15 Claims

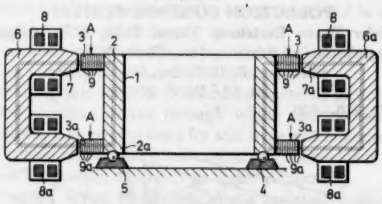


1. In a sludge filter comprising an open topped tank adapted to receive a quantity of sludge, a filter panel disposed within the tank, and a hose connection extending between the panel interior and the tank exterior to draw filtrate from the sludge filter tank, the improvement comprising a hollow, flexible, bi-walled, slick-sided, artificial cloth filter panel bag, and an open filter panel framework for supporting the bag at spaced-apart locations within the bag, the framework including a top frame member having a length sufficient to extend over the tank sides, and a strength sufficient to support the weight of the framework itself, the filter panel, any filtrate inside the panel, any material adhering to the panel outside, and at least part of the hose weight, the framework further including an open lattice of strut members depending from the top frame member at spaced apart locations, and fitting inside the cloth filter bag to maintain the bag walls in spaced-apart conditions against the pressure of sludge and water outside the bag and to permit filtrate to penetrate the bag cloth, fall to the bag bottom, and be drawn off by the filter hose.

4,116,839
HIGH INTENSITY MAGNETIC SEPARATOR FOR WET SEPARATION OF MAGNETIZABLE PARTICLES OF SOLIDS

Karl-Heinz Unkelbach, and Gottfried Duren, both of Cologne, Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Feb. 7, 1977, Ser. No. 766,124
Claims priority, application Fed. Rep. of Germany, Feb. 18, 1976, 2606408
Int. Cl.[2] B03C *1/02*
U.S. Cl. 210—222 10 Claims



1. A high intensity magnetic separator for removing magnetizable particles from a slurry, comprising:

a hollow rotor mounted for rotation about a vertical axis and including a cylindrical outer wall;

a plurality of containers mounted above the periphery of said outer wall to receive a flow of slurry therethrough;

a plurality of magnetizable bodies in each of said containers for attracting and holding magnetizable particles from the slurry under the influence of a magnetic field;

a plurality of magnetic systems circumferentially spaced about said rotor for establishing magnetic fields and neutral zones therebetween, each of said magnetic systems comprising a pair of vertically aligned, opposite polarity magnetic poles adjacent said rotor and causing a closed flux path through said rotor wall and the adjacent containers parallel to said axis;

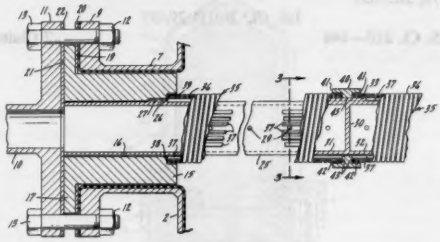
means for feeding the slurry to the containers as they rotate into each magnetic field; and

means for flushing magnetic concentrate from said magnetizable bodies while the containers are in each neutral zone.

4,116,840
LIQUID TREATMENT APPARATUS

Donald James Butterworth, Stirling, N.J., assignor to Ecodyne Corporation, Lincolnshire, Ill.

Filed Aug. 12, 1977, Ser. No. 824,005
Int. Cl.[2] B01D *23/10*
U.S. Cl. 210—279 7 Claims



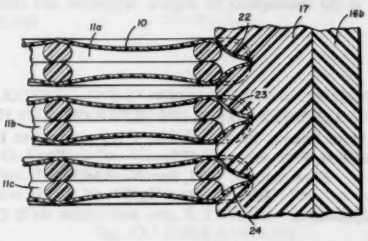
1. Liquid treatment apparatus comprising:
(a) a vessel containing granular liquid treating material and having a pair of aligned nozzles extending from opposing portions of its surface permitting liquid to enter and to leave its interior;
(b) a pair of spaced aligned spools, each spool essentially filling one of said nozzles except for a circular opening through the center of each spool;
(c) a unitary cylindrical distribution pipe having each of its opposite ends inserted into and terminating in one of said circular openings in one of said spaced aligned spools, each end of said unitary liquid distribution pipe being removable from the circular hole in the spool in which it is inserted, there being a plurality of liquid distribution holes spaced along said unitary liquid distribution pipe, an integral wall of said unitary liquid distribution pipe spanning and completely closing said unitary liquid distribution pipe at its center so as to define two separated liquid distribution sections in said unitary liquid distribution pipe, each section being fed through its own separate nozzle, an integral longitudinal rib projecting from the exterior surface of said unitary liquid distribution pipe at its center;
(d) a pair of sleeves of well screen having spaced longitudinal support rods attached to their interior surfaces, each of said screens telescoping over one of the separated liquid distribution sections of said liquid distribution pipe, said rib laying into the space between said support rods on said screens; and
(e) a sealing ring surrounding said unitary liquid distribution pipe at its center and defining with the outside surface of said unitary liquid distribution pipe a pair of annular spaces into which the ends of said well screens extend and are sealed.

4,116,841
SEMIPERMEABLE MEMBRANE MASS TRANSFER APPARATUS HAVING COLLAPSED MEMBRANE ABOUT SUPPORT MEMBERS

Alexander S. Borsanyi, Corona del Mar, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed Mar. 21, 1977, Ser. No. 779,576
Int. Cl.[2] B01D *29/04, 31/00*
U.S. Cl. 210—321 B 28 Claims

1. A mass transfer apparatus comprising a housing formed at least in part of solidified plastic material, a semipermeable membrane disposed within said housing, said membrane being folded to form a stack of accordion pleats, support members being disposed within the pleats on one side of the membrane, the ends, top and bottom and the sides of the stack being sealed to the housing except at longitudinally spaced side regions defining inlet and outlet regions on both sides of the stack, whereby two fluid compartments divided by said membrane are formed in the stack with each fluid compartment having longitudinally spaced inlet and outlet regions, the housing being provided with longitudinally spaced inlet and outlet ports individually communicating with said inlet and outlet regions enabling a fluid to be passed through each fluid compartment, those pleats of said membrane which receive said

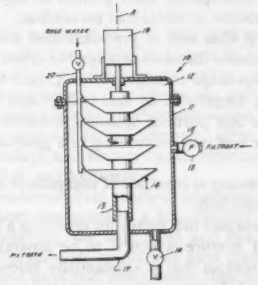


support members extending about longitudinal edges of said support members to define longitudinal creases, said creases being collapsed upon themselves and upon said longitudinal edges of said support members and being embedded in such collapsed condition in said solidified plastic material of said housing, thereby eliminating bypass channels in the compartment devoid of said support members.

4,116,842
FILTER ELEMENT FOR DISC-TYPE FILTER

Hanspeter Meier, Rapperswil, Switzerland, assignor to Dr. Ing. Hans Mueller, Maennedorf, Switzerland

Continuation of Ser. No. 701,991, Jul. 1, 1976, abandoned. This application Oct. 17, 1977, Ser. No. 842,924
Claims priority, application Switzerland, Jul. 3, 1975, 8803/75
Int. Cl.[2] B01D *33/26*
U.S. Cl. 210—330 10 Claims



1. A filter element for a centrifugal disc filter, said element comprising a dished fluid-imprevious metal plate formed with a central hole and having a concave face formed with a plurality of spaced-apart bosses, said bosses being uniformly interspersed over said face of said plate from said central hole to the outer periphery of said plate; a fluid-pervious filter cloth having one surface onto which a filtrant is to be fed and another surface spaced from said one surface and lying on said plate directly on said bosses following the concave contour of said plate so as to define a space between said plate and said filter cloth around said bosses, said bosses being located in such a close relationship relative to one another that when the filtrant is fed onto said one surface of said filter cloth the latter is supported upon and bridges the space between adjacent ones of said bosses and is thereby prevented from conforming to the

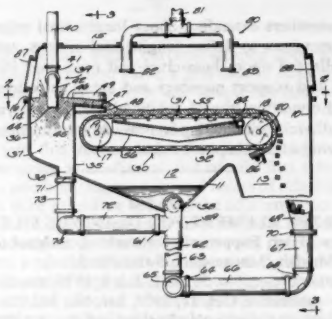
shape of said plate so as to maintain said space unobstructed to permit the flow of filtrate therein; and means for securing said cloth to said concave face.

4,116,843

LIQUID AND SOLIDS SEPARATOR

Ronald Dean Koenig, Fort Atkinson, Wis., assignor to Hartel Corporation, Fort Atkinson, Wis.

Filed Sep. 27, 1977, Ser. No. 836,936
Int. Cl.[2] B01D *33/04*
U.S. Cl. 210—391 **2 Claims**



1. Apparatus for separating a mixture of liquids and solids comprising:

first and second spaced apart pulleys arranged with their axes or rotation in substantial parallelism,

a closed loop filter belt of predetermined width and comprised of plastic filaments arranged to create a plurality of tortuous openings through the belt, said belt being for translating lengthwise on said pulleys and having upper and lower belt portions spanning between said pulleys, said upper belt portion running in a generally horizontal plane,

means for rotating at least one of said pulleys to cause translation of said belt,

a well adjacent said first pulley for receiving a fluidized solid and liquid mixture which is to be separated, said well having a bottom that is substantially below the level of said upper belt plane and a top opening which is above said plane, a planar member extending generally horizontally above and over said upper belt portion from said well opening and terminating beyond the line along the first pulley at which said upper belt portion makes its last tangential contact with said first pulley, said planar member being at a level for receiving only the overflow of said mixture from said well and for conducting said mixture on to said belt beyond said line of last tangential contact, and

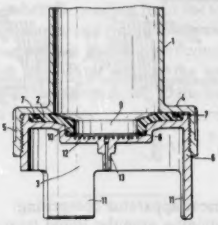
means for injecting said fluidized mixture into said well comprising a conduit disposed at the top of said well and extending in the lateral direction of said belt, said conduit having means intermediate its ends defining fluidized mixture inlet and said conduit having a plurality of nozzle means constituting outlets, said nozzle means being directed for discharging said mixture toward the bottom of said well for producing a turbulent stirring action therein.

4,116,844

COMPENSATING PLATE FOR A PRESSURE FILTRATION CELL

Wolfgang Hein; Claus Cosack, both of Dassel, and Peter Grundmann, Konigswinter, all of Fed. Rep. of Germany, assignors to Carl Schleicher & Schull, Einbeck, Fed. Rep. of Germany

Filed Jul. 22, 1977, Ser. No. 817,927
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1976, 2657031
Int. Cl.[2] B01D *29/00*
U.S. Cl. 210—446 **7 Claims**



1. A compensating plate for a pressure filtration cell including a substantially cylindrical feeding vessel and a removable base therefor which forms a filter holder, said base adapted to be connected to the vessel by means of a flanged joint, the plate having an outer edge for engagement in a flange between the vessel and the filter holder such that on its upper side, the compensating plate is sealed against the vessel by way of a circumferential seal, the plate having a central opening corresponding to the size of the filter to be used and having a slight conical depression toward the said opening, the opening designed to pass into a downwardly extending cylindrical frame whose bottom edge is adapted to press the filter against the filter holder in a sealing manner when the filter holder and the vessel are forced axially toward one another, so that the compensating plate functions as a seal between the vessel and the filter holder.

4,116,845

HIGH CAPACITY BLOOD TRANSFUSION MICRO FILTER

Roy L. Swank, Portland, Oreg., assignor to Pioneer Filters, Inc., Beaverton, Oreg.

Continuation-in-part of Ser. No. 807,378, Jun. 17, 1977. This application Aug. 1, 1977, Ser. No. 820,791
Int. Cl.[2] B01D *27/00*
U.S. Cl. 210—446 **9 Claims**

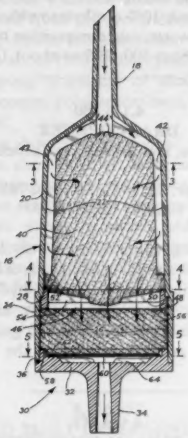
1. A blood transfusion micro filter comprising:

(a) a substantially vertically arranged elongated case having a peripheral wall terminating at its upper and lower ends in walls provided with inlet and outlet ports, respectively,

(b) a plurality of peripherally spaced longitudinal projections extending inwardly from the inner surface of the upper end wall and from the upper portion of the peripheral wall of the case,

(c) perforate blood filter material support means traversing the peripheral wall a spaced distance below the projections to form a chamber thereabove, and

(d) a quantity of woolly blood filter material contained in the chamber and fluffed into the spaces between the peripher-



ally spaced projections to provide therein filter areas of decreased filter material density.

4,116,846

HYDRAULIC FLUID COMPOSITIONS COMPRISING BORATE ESTERS

Teruyuki Sato, and Kunio Kawakatsu, both of Kyoto, Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

Filed May 24, 1977, Ser. No. 800,111
Claims priority, application Japan, May 28, 1976, 51-62628
Int. Cl.[2] C10M *3/48, 3/20*
U.S. Cl. 252—78.1 **12 Claims**

1. A hydraulic fluid composition having a boron content of 0.2 to 1.6% by weight comprising:

(a) a reaction product selected from the group consisting of the reaction product of (i) and (iii) with (iv); (i), (ii) and (iii) with (iv) and mixtures thereof, wherein:

(i) is at least one polyglycol monoether of the formula:

$$R_1 — OA_1)_m OH$$

wherein R_1 is C_1-C_4 alkyl, A_1 is C_2-C_3 alkylene and n is 2 to 8;

(ii) is at least one polyglycol of the formula:

$$H — OA_2)_n OH$$

wherein A_2 is C_2-C_3 alkylene and n is 2 to 10;

(iii) is at least one polyalkylene mono- or poly-ol of the formula:

$$R_2[— OA_3)_q OH]_p$$

wherein R_2 is a residue of a C_1-C_8 mono-ol or C_1-C_8 poly-ol, A_3 is C_2-C_3 alkylene, p is 1 to 4 and q is a number such that the molecular weight of component (iii) is 1,000 to 5,000; and

(iv) is at least one boron compound having an ability to form borate esters;

(b) at least one polyglycol monoether of the formula:

$$R_3 — OA_4)_a OH$$

wherein R_3 is C_1-C_4 alkyl, A_4 is C_2-C_3 alkylene and a is 2 to 8;

(c) at least one polyglycol of the formula:

$$H — OA_5)_b OH$$

wherein A_5 is C_2-C_3 alkylene and b is 2 to 10; and

(d) at least one polyoxyalkylene mono- or poly-ol of the formula:

$$R_4[— OA_6)_c OH]_d$$

wherein R_4 is a residue of a C_1-C_8 mono-ol or C_1-C_8 poly-ol, A_6 is C_2-C_3 alkylene, d is 1 to 4 and c is a number such that the molecular weight of component (d) is 1,000 to 5,000.

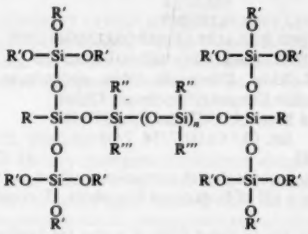
4,116,847

ALKOXYSILANE DOUBLE CLUSTER COMPOUNDS WITH SILICONE BRIDGES AND THEIR PREPARATION AND USE

Karl O. Knollmueller, Hamden, Conn., assignor to Olin Corporation, New Haven, Conn.

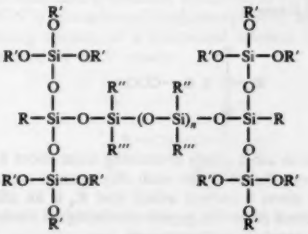
Division of Ser. No. 791,671, Apr. 28, 1977, Pat. No. 4,058,546.
This application Aug. 8, 1977, Ser. No. 822,852
Int. Cl.[2] C10M *3/44, 3/46*
U.S. Cl. 252—78.3 **20 Claims**

1. In a functional fluid method comprising converting a first mechanical effort to pressure at a first location, transmitting said pressure from said first location to a second location through use of a hydraulic fluid, and converting said pressure at said second location to a second mechanical effort, the improvement characterized by using a hydraulic fluid comprising an effective amount of a compound having the formula:



wherein n is an integer from 0 to 300; R is hydrogen, alkyl, alkenyl, aryl, aralkyl or —OSi(OR′)$_3$; each R′ is independently selected from alkyl, alkenyl, aryl or aralkyl with the proviso that at least a majority of R′ radicals are sterically hindered alkyl groups having at least 3 carbon atoms; and R″ and R‴ are independently selected from hydrogen, alkyl, alkenyl, aryl, aralkyl, hydroalkyl, and halo or cyano substituted alkyl, alkenyl, aryl, aralkyl, and hydroalkyl.

11. In a functional fluid method comprising passing heat from a first heat conductor to a heat transfer fluid at a first location, transmitting the heat from said first location to a second location through use of said heat transfer fluid, and passing said heat from said heat transfer fluid to a second heat conductor at said second location, the improvement characterized by using a heat transfer fluid comprising an effective amount of a compound having the formula:



wherein n is an integer from 0 to 300; R is hydrogen, alkyl, alkenyl, aryl, aralkyl or $-OSi(OR')_3$; each R' is independently selected from alkyl, alkenyl, aryl or aralkyl with the proviso that at least a majority of R' radicals are sterically hindered alkyl groups having at least 3 carbon atoms; and R'' and R''' are independently selected from hydrogen, alkyl, alkenyl, aryl, aralkyl, hydroalkyl, and halo or cyano substituted alkyl, alkenyl, aryl, aralkyl, and hydroalkyl.

4,116,848

NOVEL CLEANING METHOD AND COMPOSITIONS

Daniel Schoenholz, Basking Ridge; Arthur Walter Petersen, Florham Park, and Marcus Allen Northup, Jr., Morristown, all of N.J., assignors to Church & Dwight Co., Inc., New York, N.Y.

Division of Ser. No. 361,140, May 17, 1973, Pat. No. 3,808,051, which is a continuation-in-part of Ser. No. 265,639, Jun. 23, 1972, abandoned. This application Nov. 7, 1973, Ser. No. 413,643

Int. Cl.[2] C11D *17/00*

U.S. Cl. 252—90 **10 Claims**

1. A weakly alkaline composition for removing soil containing free or combined organic acids from a surface comprising (A) 1 to 99% by weight of an active ingredient consisting of at least two alkali metal salts of weak organic acids which will melt at temperatures between 250° and 550° F at which the weak organic acids will volatilize and/or decompose and (B) 1 to 5% by weight of a thickening agent, (C) 1 to 60% by weight of a finely divided inorganic material and (D) and the balance being an aqueous carrier.

4,116,849

THICKENED BLEACH COMPOSITIONS FOR TREATING HARD-TO-REMOVE SOILS

John William Leikhim, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 14, 1977, Ser. No. 777,191

Int. Cl.[2] C11D *7/54, 7/56*

U.S. Cl. 252—103 **11 Claims**

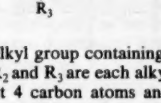
1. An alkaline, aqueous, liquid composition which is free of abrasives, having a pH of from about 9 to about 13, consisting essentially of:

(a) from about ¼% to about 20% of a clay thickening and corrosion protection agent selected from the group consisting of smectite and attapulgite clays and mixtures thereof,

(b) from about ½% to about 9% of an alkali metal silicate having an SiO_2:M_2O ratio greater than about 1 wherein M is selected from the group consisting of sodium and potassium,

(c) a hypohalite liberating bleach component selected from the group consisting of alkali metal and alkaline earth metal hypochlorites and hypobromites, heterocyclic N-bromo and N-chloro imides and mixtures thereof, said hypohalite liberating bleach component being at a concentration to provide an available halogen level of from about ½% to about 10%,

(d) from 0% to about 10% of a bleach stable surfactant selected from the group consisting of alkyl sulfate salts containing from about 8 to about 18 carbon atoms in the alkyl group and water-soluble betaine surfactants having the general formula:



wherein R_1 is an alkyl group containing from about 8 to 18 carbon atoms, R_2 and R_3 are each alkyl groups containing from 1 to about 4 carbon atoms and R_4 is an alkylene group selected from the group consisting of methylene, propylene, butylene and pentylene,

(e) from 0% to about 15% of detergency improvers selected from the group consisting of alkali metal carbonates, polyphosphonates, polycarboxylates, phosphates and mixtures thereof, and

(f) from 0% to about 10% methylene chloride, and

(g) the remainder water, said composition having a viscosity of from about about 100 CPS to about 1,000,000 CPS.

4,116,850

DRAIN OPENER

J. Barry Ruck, Tampa, Fla., assignor to Theochem Laboratories, Inc., Tampa, Fla.

Filed Apr. 21, 1977, Ser. No. 789,534

Int. Cl.[2] C11D *7/54*

U.S. Cl. 252—103 **4 Claims**

1. A drain opening composition consisting essentially of 10–60% by weight of a water-soluble hydroxide selected from the group of ammonium and alkali metal hydroxides, 0.1–15.0 by weight of a chlorine releasing agent, and 0.01–10% by weight of a compound selected from the group consisting of the chlorides of the period six metals of the periodic table of the elements.

4,116,851

THICKENED BLEACH COMPOSITIONS FOR TREATING HARD-TO-REMOVE SOILS

Lewis Allen Rupe; Lyle Brown Tuthill, and John William Leikhim, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jun. 20, 1977, Ser. No. 808,016

Int. Cl.[2] C11D *7/54, 7/56*

U.S. Cl. 252—103 **13 Claims**

1. An alkaline, aqueous, liquid composition having a pH of from about 9 to about 13, consisting essentially of:

(a) from about ¼% to about 20% of a clay thickening and corrosion protection agent selected from the group consisting of smectite and attapulgite clays and mixtures thereof,

(b) from about ½% to about 9% of an alkali metal silicate having an SiO_2:M_2O ratio greater than about 1 wherein M is selected from the group consisting of sodium and potassium,

(c) from about ¼% to about 20% of a safety, dispensing, and/or cleaning improver selected from the group consisting of water-insoluble mineral oil compounds containing carbon chains in excess of about 20 carbon atoms and having a specific gravity of at least about 0.82, water-insoluble saturated fatty acid esters containing from about 13 to about 22 carbon atoms, water-insoluble dialkyl ethers wherein each alkyl contains from 1 to about 13 carbon atoms and the total carbon atoms is from about 7 to about 14, and mixtures thereof having a freezing point below about 15° C. and a vapor point above about 100° C.

(d) a hypohalite liberating bleach component selected from the group consisting of alkali metal and alkaline earth metal hypochlorites and hypobromites, brominated trisodium phosphate, chlorinated trisodium phosphate, heterocyclic N-bromo and N-chloro imides and mixtures thereof, said hypohalite liberating bleach component being at a concentration to provide an available halogen level of from about ½% to about 10%,

(e) from 0% to about 10% of a bleach stable surfactant selected from the group consisting of alkyl sulfate salts containing from about 8 to about 18 carbon atoms in the alkyl group and water-soluble betaine surfactants having the general formula:

wherein R_1 is an alkyl group containing from about 8 to 18 carbon atoms, R_2 and R_3 are each alkyl groups containing from 1 to about 4 carbon atoms and R_4 is an alkylene group selected from the group consisting of methylene, propylene, butylene and pentylene,

(f) from 0% to about 15% of detergency improvers selected from the group consisting of alkali metal carbonates, polyphosphonates, polycarboxylates, phosphates and mixtures thereof,

(g) from 0% to about 10% methylene chloride, and

(h) from 0% to about 60% of an abrasive selected from the group consisting of quartz, pumice, pumicite, titanium dioxide, silica sand, calcium carbonate, zirconium silicate, diatomaceous earth, whiting, feldspar and mixtures thereof, said abrasive having particle size diameters of from about 1 to about 250 microns and specific gravities of from about 0.5 to about 5.0, and

(i) the remainder water, said composition having a viscosity of from about 100 CPS to about 1,000,000 CPS.

4,116,852

BUILDERS AND BUILT DETERGENT COMPOSITIONS

John Bailey, Ryton; Michael John Randell, and Paul Richard Sherrington, both of Newcastle upon Tyne, all of England, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 657,655, Feb. 12, 1976, abandoned. This application Aug. 24, 1977, Ser. No. 828,111

Claims priority, application United Kingdom, Feb. 14, 1975, 6357/75

Int. Cl.[2] C11D *3/06, 7/16*

U.S. Cl. 252—135 **9 Claims**

1. A detergent composition consisting essentially of:

(a) from about 1% to about 50% by weight of the composition of an organic surfactant selected from the group consisting of water soluble anionic, nonionic, ampholytic and zwitterionic surfactants and mixtures thereof; and

(b) from about 5% to about 60% by weight of the composition of a detergent builder consisting of a mixture of water soluble alkali metal phosphates selected from the group consisting of orthophosphates, pyrophosphates and tripolyphosphates, wherein the amount of tripolyphosphate lies in the range from about 1% to about 15% by weight of the phosphate mixture and wherein the amount of orthophosphates in the phosphate mixture is less than about 1% by weight of the phosphate mixture.

4,116,853

COMPOSITION FOR CLEANING ALUMINUM AT LOW TEMPERATURES

Robert Eric Binns, Roslyn, Pa., assignor to Amchem Products, Inc., Ambler, Pa.

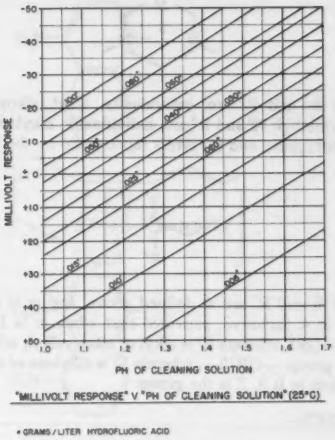
Division of Ser. No. 755,929, Dec. 30, 1976, and a continuation-in-part of Ser. No. 607,154, Aug. 25, 1975, Pat. No. 4,009,115, which is a continuation-in-part of Ser. No. 442,726, Feb. 14, 1974, abandoned. This application Dec. 30, 1976, Ser. No. 755,928

The portion of the term of this patent subsequent to Feb. 22, 1994, has been disclaimed.

Int. Cl.[2] C11D *7/08, 1/72;* **C23G** *1/12, 1/02*

U.S. Cl. 252—142 **3 Claims**

1. An aqueous cleaning composition for removing and dissolving aluminum fines and lubricating oils from an aluminum surface comprising hydrofluoric acid present in an amount of at least about 0.005 grams/liter of cleaning solution, sulfuric acid present in an amount from about 1.0 gram/liter to about 10 grams/liter of cleaning solution and a surfactant present in an amount from about 0.1 gram/liter to about 10 grams/liter of cleaning solution the hydrofluoric acid being present in an amount such that the composition has an aluminum dissolution



"MILLIVOLT RESPONSE" V "PH OF CLEANING SOLUTION" (25°C)

• GRAMS / LITER HYDROFLUORIC ACID

rate from about 8 to about 25 milligrams per square foot of aluminum surface treated.

4,116,854

DETERGENT COMPOSITIONS CONTAINING STARCH

Robert Dwight Temple; William Thomas Bryan, and Carl Joseph Willig, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 14, 1977, Ser. No. 768,675

Int. Cl.[2] C11D *3/22, 3/43*

U.S. Cl. 252—167 **12 Claims**

1. A laundry detergent composition comprising:

(a) from about 4% to about 60% by weight of an organic surface-active agent selected from the group consisting of anionic, nonionic, zwitterionic and ampholytic detergents and mixtures thereof; and

(b) from about 0.1% to about 6% by weight of granular substantially water-insoluble starch having an average particle diameter of from about 1 to about 45 micrometers and a swelling power of less than about 15 at a temperature of 65° C., said starch containing from about 0.01% to about 5% by weight of a substantially water-insoluble organic liquid.

4,116,855

STABILIZED ACCELERATOR COMPOSITION FOR RUBBER

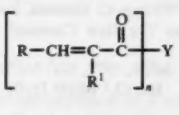
Rudolf Adolf Behrens, Gladstone, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 18, 1977, Ser. No. 779,113

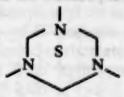
Int. Cl.[2] C08K *5/43, 5/35*

U.S. Cl. 252—182 **5 Claims**

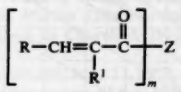
1. A stabilized accelerator composition for rubber comprising N,N'-[(thiocarbonyl)thio]dimorpholine and an effective stabilizing amount of a compound selected from (a) amides represented by the Formula



wherein R and R^1 are hydrogen or methyl; n is an integer of 1 to 3, inclusive, and Y is selected from $—NH_2$, $—NHR^2$, $—N(R^3)_2$, $—(NH)_2R^4$, $—(NHCH_2O)_2R^5$ and



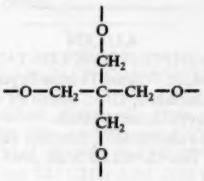
wherein R^2 and R^3 are, individually, alkyl, alkoxyalkyl or hydroxymethyl; R^4 and R^5 are, individually, alkylene, arylene or oxydialkylene; and (b) esters represented by the Formula:



wherein R and R^1 are as defined above, and *m* is an integer from 1 to 4, inclusive, provided that when *m* is 1, Z is the group: $—OR^6$, wherein R^6 is alkyl or alkoxyalkyl; when *m* is 2, Z is the group: $—OR^70—$, wherein R^7 is alkylene or oxydialkylene; when *m* is 3, Z is the group:

$—OR^80—$

wherein R^8 is alkylene; and when *m* is 4, Z is the group:



4,116,856

RECOVERY OF LITHIUM FROM BRINES

John M. Lee, and William C. Bauman, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 5, 1977, Ser. No. 812,534
Int. Cl.² B01D *15/04*
U.S. Cl. 252—184 **9 Claims**

1. A process for preparing a microcrystalline $LiX.2Al(OH)_3$ suspended in an anion exchange resin, the said process comprising,

providing a particulate anion exchange resin substantially in neutral or basic form having suspended therein hydrous alumina conforming to the formula $Al(OH)_3$,

reacting said $Al(OH)_3$ with aqueous LiOH at a temperature and for a period of time sufficient to form micro-crystalline $LiOH.2Al(OH)_3$ suspended in said resin,

reacting the so-formed $LiOH.2Al(OH)_3$ with a halogen acid or halide salt to convert it to $LiX.2Al(OH)_3$, where X is a halide.

4,116,857

RECOVERY OF MG^{++} FROM BRINES

John M. Lee, and William C. Bauman, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 5, 1977, Ser. No. 812,542
Int. Cl.² B01D *15/04*
U.S. Cl. 252—184 **9 Claims**

1. A composition of matter comprising a particulate anion exchange resin having suspended therein microcrystalline $MgX_2.2Al(OH)_3$, where X is a halide.

4,116,858

RECOVERY OF LITHIUM FROM BRINES

John M. Lee, and William C. Bauman, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 5, 1977, Ser. No. 812,543
Int. Cl.² B01D *15/04*
U.S. Cl. 252—184 **10 Claims**

1. A particulate, anion exchange resin having suspended therein a microcrystalline form of $LiX.2Al(OH)_3$, where X is a halogen.

4,116,859

METHOD OF PREPARING OXYGEN-CONTAINING BLEACH AND PRODUCT SO PRODUCED

George G. Merkl, 46 Sunset Ct., Haworth, N.J. 07651

Continuation-in-part of Ser. No. 534,084, Dec. 23, 1974, abandoned. This application Jan. 10, 1977, Ser. No. 758,343
Int. Cl.² C07C *179/20, 179/02;* C11D *3/395, 7/54*
U.S. Cl. 252—186 **9 Claims**

1. A method of preparing an oxygen-containing bleach which comprises:

mixing at a temperature below about 75° F.

(a) an aqueous solution of a water-soluble, multi-metal, inorganic, NH_2 group-containing monomeric complex; and

(b) hydrogen peroxide

whereby said hydrogen peroxide (b) reacts with said monomeric complex (a) upon mixing, and said oxygen-containing bleach crystallizes out of the reaction system.

4,116,860

REGENERANT COMPOSITION AND METHOD FOR REGENERATION OF WEAK ACID CATION EXCHANGE RESIN

Robert Kunin, Yardley, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 698,459, Jun. 21, 1976, Pat. No. 4,071,446. This application Sep. 28, 1977, Ser. No. 837,344
Int. Cl.² C09K *3/00*
U.S. Cl. 252—192 **2 Claims**

1. A composition for regenerating weak acid cation exchange resin comprising about 70 to 80 weight percent alkali metal chloride, about 5 to 15 percent alkali metal carbonate, and the balance alkali metal chelating polycarboxylate.

4,116,861

DICHROIC LIQUID CRYSTAL COMPOSITIONS

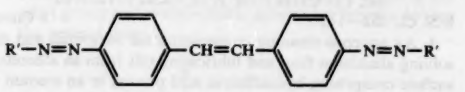
Siegfried Aftergut, Schenectady, and Herbert S. Cole, Jr., Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 18, 1977, Ser. No. 825,660
Int. Cl.² C09K *3/34;* G02F *1/13*
U.S. Cl. 252—299 **4 Claims**

1. A dichroic liquid crystal composition for use in a liquid crystal display, comprising:

a host liquid crystal material; and

a guest dichroic dye exhibiting high order parameter values in said host, wherein the dichroic dye is selected from the group consisting of compounds of the chemical formula



where the radical R′ is selected in accordance with a desired approximate maximum absorption wavelength (λ) from the following table:

TABLE

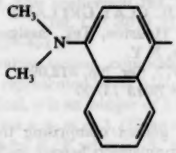
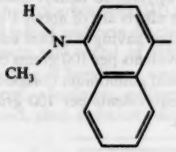
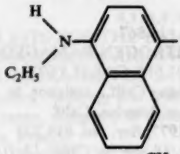
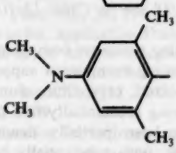
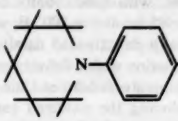
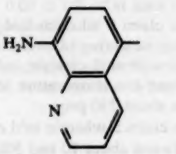
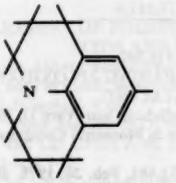
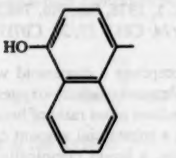
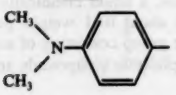
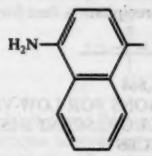
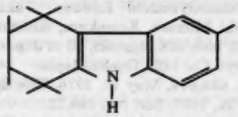
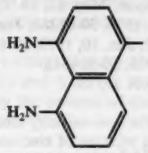
DYE	R'	λ(nm.)
1		490
2		495
3		495
4		470
5		450
6		450
7		470
8		480
9		440

TABLE-continued

DYE	R'	λ(nm.)
10		500
11		450
12		540

4,116,862

NEW PHOTOCHROMIC MATERIALS AND METHOD FOR THEIR PREPARATION

Constant Wippler, Illkirch Graffenstaden, France, assignor to Essilor International (Compagnie Generale d'Optique), Joinville-le-Pont, France

Filed Apr. 27, 1977, Ser. No. 791,638
Claims priority, application France, Apr. 30, 1976, 76 12962
Int. Cl.[2] G03C 1/733
U.S. Cl. 252—300 **18 Claims**

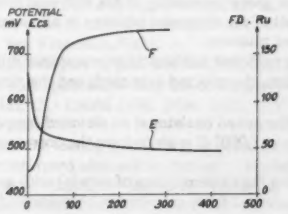
1. A photochromic material comprising a transparent polymer material having a block copolymer base with a structure wherein blocks of a first polymer form a dispersed phase in a matrix phase essentially composed of blocks of a second polymer, and an organic photochromic substance being uniformly distributed in said polymer material and being selectively retained in the area of one of said phases.

4,116,863

METHOD OF DECONTAMINATION OF RADIOACTIVE EFFLUENTS

Yves Berton, Le Puy Ste Reparade, and Pierre Chauvet, Manosque, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 23, 1977, Ser. No. 780,498
Claims priority, application France, Mar. 31, 1976, 76 09307; Jan. 27, 1977, 77 02285
Int. Cl.[2] G21F 9/06
U.S. Cl. 252—301.1 W **21 Claims**



1. A method of decontamination of a radioactive effluent containing at least ruthenium, of the type in which a certain number of precipitates having absorbent and/or coprecipitant properties with respect to radioactive elements contained in an

effluent are formed in said effluent without intermediate phase separation, wherein a reduction of the effluent to be treated is made by the addition to the effluent of hydrazine or of a hydrazine salt and a cobalt sulphide precipitate is then formed in the effluent.

4,116,864

FLUORESCENT COMPOSITIONS FOR LOW-VELOCITY ELECTRON EXCITED FLUORESCENT DISPLAY DEVICES

Akiyasu Kagami, Ninomiyamachi Kawawa; Takashi Hase, Fujisawa; Yoshiyuki Mimura, Kamakura; Kinichiro Narita, and Minoru Hiraki, both of Chigasaki, all of Japan, assignors to Dai Nippon Toryo Co. Ltd., Osaka, Japan

Division of Ser. No. 684,674, May 10, 1976. This application Jan. 19, 1977, Ser. No. 760,721

Claims priority, application Japan, May 12, 1975, 50-56870; May 13, 1975, 50-57104; May 22, 1975, 50-61281; Jun. 10, 1975, 50-69861; Jun. 10, 1975, 50-69862; Jun. 10, 1975, 50-69863; Aug. 28, 1975, 50-104257; Aug. 29, 1975, 50-104643

Int. Cl.[2] **C09K** *11/18*

U.S. Cl. 252—301.6 S **2 Claims**

1. A fluorescent composition for low-velocity electron excitation consisting of a mechanical mixture of zinc oxide (ZnO) and a silver activated zinc sulfide phosphor (ZnS:Ag), said zinc oxide and said phosphor being present in a weight ratio from 1:9 to 9:1, the amount of silver contained in said phosphor being from 10^{-5} to 10^{-3} gram per one gram of zinc sulfide.

4,116,865

METHOD FOR PREPARING THERMOLUMINESCENT MATERIALS UTILIZING RARE EARTH OXYHALIDES ACTIVATED WITH TERBIUM

Jacob G. Rabatin, Chardon, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 625,788, Oct. 24, 1975, abandoned, which is a division of Ser. No. 565,642, Apr. 7, 1975, Pat. No. 3,996,472. This application Feb. 4, 1977, Ser. No. 765,511

Int. Cl.[2] **C09K** *11/46*

U.S. Cl. 252—301.4 H **11 Claims**

1. A method for preparing a rare earth oxyhalide thermoluminescent material essentially expressed by the formula:

$$M_{1-w-y}OX:Tb_wA_y$$

wherein M is an element selected from the group consisting of La, Gd and Y;

X is an element selected from the group consisting of Cl and Br;

A is an elemental additive selected from the group consisting of Zr and Hf;

w is from 0.005 to 0.30 mole per mole of the oxyhalide; and

y is from a small but effective amount to improve the thermoluminescence up to 0.01 mole per mole of the selected oxyhalide, said method comprising the steps of:

(a) dissolving terbium oxide, an oxide of a rare earth selected from the group consisting of La, Gd, and Y and an inorganic salt of the elemental additive in nitric acid to form a dissolved mixture,

(b) adding sufficient oxalic acid to precipitate mixed oxalates of terbium, the selected rare earth and the elemental additive,

(c) firing the mixed oxalates at an elevated temperature of at least about 1,000° C in air to form the corresponding oxide mixture,

(d) blending the oxide mixture of step (c) with an ammonium halide selected from ammonium chloride and ammonium bromide,

(e) firing the blend of step (d) at an elevated temperature of about 400° C to form the corresponding oxyhalide thermoluminescent material,

(f) blending the thermoluminescent material with an alkali metal halide having the same halide ion as the oxyhalide, and

(g) recrystallizing the blended material of step (f) by refiring in the temperature range 800°–1200° C.

4,116,866

ORGANOPHILIC CLAY GELLANT

Claude Malcolm Finlayson, Houston, Tex., assignor to N L Industries, Inc., New York, N.Y.

Filed Jul. 1, 1977, Ser. No. 812,099

Int. Cl.[2] **B01J** *13/00*

U.S. Cl. 252—316 **9 Claims**

1. An organophilic clay gellant comprising the reaction product of a castor-fatty propylamido benzyl dialkyl ammonium compound wherein the alkyls are of about 1 to 3 carbon atoms and a smectite-type clay having a cation exchange capacity of at least 75 milliequivalents per 100 grams of said clay, and wherein the amount of said ammonium compound is from about 90 to about 120 milliequivalents per 100 grams of said clay, 100% active clay basis.

4,116,867

REJUVENATION OF NITROGEN-DAMAGED NOBLE METAL ZEOLITE CATALYSTS

John W. Ward, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Jul. 11, 1977, Ser. No. 814,339

Int. Cl.[2] **B01J** *29/38, 29/12;* **C10G** *13/10*

U.S. Cl. 252—416 **8 Claims**

1. A method for rejuvenating a catalyst comprising a Group VIII noble metal hydrogenating component supported on a hydrogen- and/or decationized crystalline aluminosilicate zeolite base, said catalyst being substantially free of carbonaceous deposits but having been partially deactivated by contact, in its oxidized state, with substantially oxygen-free elemental nitrogen at temperatures above 200° F, which comprises subjecting said partially deactivated catalyst without intervening reduction, to oxidation with a flowing stream of an oxygen-containing gas at temperatures between about 400° and 1200° F, and thereafter reducing the oxidized catalyst with hydrogen.

5. A method as defined in claim 1 wherein said contacting with elemental nitrogen occurred during pressure testing with nitrogen of a reactor loaded with said catalyst, said pressure testing having been carried out at a temperature above about 300° F and a pressure above about 750 psig.

8. A method as defined in claim 5 wherein said oxidation is carried out at a pressure between about 10 and 500 psig.

4,116,868

METHOD FOR PREPARING AN OXIDATION CATALYST

Ramon A. Mount; Harold Raffelson, and Warn D. Robinson, all of St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 552,481, Feb. 24, 1975, abandoned. This application Dec. 1, 1976, Ser. No. 746,282

Int. Cl.[2] **B01J** *31/02, 27/14;* **C01B** *25/26;* **C07D** *307/60*

U.S. Cl. 252—428 **6 Claims**

1. A dispersion which comprises a dispersoid which comprises a finely divided phosphorus-vanadium-oxygen precursor having a phosphorus to vanadium atom ratio of between about 0.9:1 and about 2:1 wherein a substantial amount of the vanadium is tetravalent vanadium, a liquid chemically inert with the dispersoid and at least about 0.01 weight percent of a surfactant selected from the group consisting of anionic, nonionic, zwitterionic, and ampholytic compounds and mixtures thereof.

4,116,869

ORGANOALUMINUM-ORGANOPHOSPHINE-METAL SALT OF A BETA-DIKETONE CATALYST SYSTEM

Henry L. Hsieh, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 577,137, May 13, 1975, Pat. No. 4,020,018, which is a division of Ser. No. 416,816, Nov. 19, 1973, Pat. No. 3,925,317. This application Jan. 21, 1977, Ser. No. 761,090

Int. Cl.[2] B01J *31/12, 31/14*

U.S. Cl. 252—431 P 8 Claims

1. A catalyst system comprising (I) an organoaluminum compound represented by R_nAlH_m wherein each R is a hydrocarbon radical, n is an integer of 1 to 3, inclusive, and m is 0, 1, or 2, such that $n + m = 3$, (II) an organophosphine compound represented by R_3^1P wherein R^1 is a hydrocarbon or alkoxy-substituted hydrocarbon and (III) a beta-diketone substantially as the metal salt of said beta diketone, in catalytically effective ratios, wherein said metal of said (III) is selected from the group consisting of beryllium, magnesium, calcium, strontium, barium, boron, aluminum, gallium, indium, thallium, germanium, tin, lead, zinc, cadmium, and mercury.

4,116,870

CATALYSTS FOR THE HYDROTREATMENT OF HYDROCARBONS AND PROCESSES FOR THE UTILIZATION OF SAID CATALYSTS

Joseph Edouard Weisang, and Philippe Engelhard, both of Le Havre, France, assignors to Compagnie Francaise de Raffinage, Paris, France

Filed May 28, 1976, Ser. No. 690,908

Claims priority, application France, May 28, 1975, 75 16703

The portion of the term of this patent subsequent to Aug. 10, 1993, has been disclaimed.

Int. Cl.[2] B01J *27/04, 27/08, 27/10*

U.S. Cl. 252—439 24 Claims

1. A catalyst for the hydro-treatment of hydrocarbons comprising a refractory inorganic oxide support having acid sites, having between about 0.4 and 2% of halogen present in combined form with other catalyst components, and consisting essentially of the following on said support:

(a) about 0.02 to 2% of at least one platinum-metal ingredient,

(b) about 0.02 to 2% of at least one additional zirconium, or titanium ingredient, and

(c) about 0.02 to 2% of a tin ingredient; said weight percentages being calculated with respect to the respective elemental forms of said components and based on the total weight of the catalyst.

4,116,871

PREPARATION OF PHOSPHORUS-CONTAINING ACIDS AND SALTS

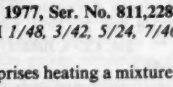
Andrew Doyle Abbott, Greenbrae, and George J. Benoit, San Anselmo, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Jun. 29, 1977, Ser. No. 811,228

Int. Cl.[2] C10M *1/48, 3/42, 5/24, 7/46*

U.S. Cl. 252—32.7 E 7 Claims

1. A process which comprises heating a mixture of an acid of the formula



(A)

and an acid of the formula

(B)

for 3 to 10 hours at 55° to 95° C to form a mixture of acids (A) and (B) and an acid of the formula

(C)

wherein R is alkyl and R^1 is aryl.

2. The process according to claim 1 wherein the acid mixture is neutralized with a compound supplying a monovalent or divalent cation.

3. The process according to claim 2 wherein said compound is zinc, zinc oxide, zinc carbonate, potassium hydroxide or sodium hydroxide.

4. The process of claim 3 wherein R is C_1–C_{20} is alkyl, R^1 is phenyl or phenyl substituted by 1–3 alkyl groups of 1–20 carbon atoms each, and said compound is zinc oxide or zinc carbonate.

5. A lubricating oil composition containing an oil of lubricating viscosity and from 0.1 to 99% by weight of the product prepared by the process of claim 4.

4,116,872

HOT MELT METAL WORKING LUBRICANTS

Richard William Jahnke, Mentor-On-The-Lake, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Filed Feb. 8, 1977, Ser. No. 766,642

Int. Cl.[2] C10M *1/48, 3/42, 5/24, 7/46*

U.S. Cl. 252—32.7 E 33 Claims

1. A method for lubricating metal during working thereof which comprises applying to said metal a lubricating composition which provides lubricity thereto, said composition melting within the range of about 30°–100° C. and comprising at least one substantially neutral ester defined as follows:

I. The alcohol moieties are derived from (A) a polyalkylene glycol containing about 20–50 polyoxyalkylene units, or a mixture thereof with (B) at least one saturated aliphatic alcohol having at least about 10 carbon atoms;

II. The acid moieties are derived from (C) at least one C_{12-25} aliphatic monocarboxylic acid, or a mixture thereof with (D) at least one C_{4-20} aliphatic polycarboxylic acid.

16. A composition which melts within the range of about 30°–100° C. and which provides lubricity to metal surfaces, said composition comprising a mixture of substantially neutral esters defined as follows:

I. The alcohol moieties are derived from (A) a polyalkylene glycol containing about 20–50 polyoxyalkylene units and (B) at least one saturated aliphatic alcohol having at least about 10 carbon atoms;

II. The acid moieties are derived from (C) at least one C_{12-25} aliphatic monocarboxylic acid and (D) at least one C_{4-20} aliphatic polycarboxylic acid.

4,116,873

LUBRICATING OIL COMPOSITION CONTAINING GROUP I OR GROUP II METAL OR LEAD SULFONATES

Louis de Vries, Greenbrae, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 585,411, Jun. 9, 1975, abandoned. This application May 10, 1976, Ser. No. 682,073

Int. Cl.[2] C10M *1/40, 3/34, 5/22, 7/38*

U.S. Cl. 252—33 35 Claims

1. An oil-soluble Group I or Group II metal or lead salt of a substantially saturated aliphatic hydrocarbylethylsulfonic acid in which the substantially saturated aliphatic hydrocarbyl group contains from about 50 to about 200 carbons atoms.

25. A composition comprising:

a major amount of an oil of lubricating viscosity, and

a detergent-dispersant amount up to 15% by weight of an oil-soluble Group I or Group II metal or lead salt of a substantially saturated aliphatic hydrocarbyl ethylsulfonic

acid in which the substantially saturated hydrocarbyl group contains 50–200 carbon atoms.

4,116,874

COMPRESSOR OIL COMPOSITIONS

Kensuke Sugiura; Toru Miyagawa, both of Kawasaki, and Haruo Seki, Yokohama, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 718,319, Aug. 27, 1976, abandoned. This application Jun. 22, 1977, Ser. No. 809,069

Claims priority, application Japan, Aug. 27, 1975, 50-103054

Int. Cl.[2] C10M *1/48, 3/42, 5/24, 7/46*

U.S. Cl. 252—46.7 **6 Claims**

1. A compressor oil composition comprising (A) a major proportion of a lubricating base oil selected from the group consisting of refined products of mineral lubricating oils having a viscosity at 37.8° C. of 20 to 100 centistokes and synthetic hydrocarbon oils having a viscosity at 37.8° C of 20 to 100 centistokes, and (B) 0.01 to 3.0% by weight, based on the total weight of the compressor oil composition, of each of (a) an aromatic amine selected from the group consisting of diphenylamine, phenyl-α-naphthylamine, phenyl-β-naphthylamine, phenyl-p-octylphenylamine, p,p′-dioctyldiphenylamine, 2,6-ditert.-butyl-α-dimethylamino-p-cresol and tetramethyldiaminodiphenylmethane, (b) an alkylphenol selected from the group consisting of 2,6-di-tert.-butyl-p-cresol, 4,4′-methylenebis(2,6-di-tert.-butylphenol), 4,4′-dihydroxy-3,3′,5,5′-tetratert.-butyl biphenyl, 4,4′-thiobis(2,6-di-tert.-butylphenol), bis(3,5-di-tert.-butyl-4-hydroxybenzyl) sulfide and 2,2′-methylenebis(4-methyl-6-tert.-butylphenol), and (c) a triester of dithiophosphoric acid selected from the group consisting of S-dodecyl O,O′-dipropyl dithiophosphate, O,O′-bis(-propylphenyl)-S-benzyl dithiophosphate and O,O′-bis(propylphenyl)-S-styryl dithiophosphate.

4,116,875

MULTIFUNCTIONAL SUBSTITUTED TRIAZINE FUNCTIONAL FLUID ADDITIVES AND COMPOSITIONS CONTAINING SAME

John C. Nnadi, Glassboro, and Israel J. Heilweil, Princeton, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 576,529, May 9, 1975, abandoned, which is a continuation-in-part of Ser. No. 248,226, Apr. 27, 1973, Pat. No. 3,888,773. This application Jun. 9, 1977, Ser. No. 805,111

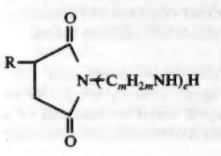
Int. Cl.[2] C10M *1/10*

U.S. Cl. 252—49.7 **15 Claims**

1. An organic composition comprising a major proportion of an organic fluid lubricant or fuel medium and a minor proportion, sufficient to provide detergent, anti-oxidant or antiwear properties thereto, of a heterocyclic nitrogen compound selected from the group consisting of:

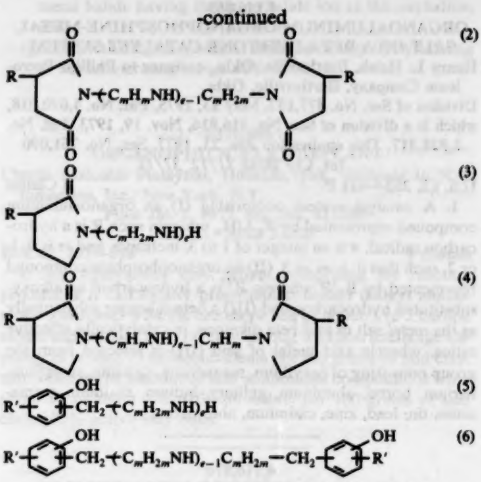
(a) a compound comprising at least two triazine nuclei, said nuclei being substituted by at least one monovalent amine substituent, said monovalent amine substituent being bonded through an amino nitrogen atom to a carbon atom of one of said triazine nuclei, said triazine nuclei being interlinked with a bivalent amine radical bonded through amino nitrogen atoms to a carbon atom of each of said triazine nuclei,

the amine of said monovalent amine substituent being selected from the group consisting of:



(1)

-continued



(2)

(3)

(4)

(5)

(6)

the amine of said bivalent amine radical being selected from the group consisting of:

$H_2N(C_mH_{2m}NH)_eH$ (7)

and

(8)

wherein:

m is an integer of from 1 to 3;

e is an integer of from 1 to 10;

R is an alkenyl group containing from 8 to about 10,000 carbon atoms; and

R′ is an alkyl group containing from 8 to about 10,000 carbon atoms; and

(b) a substituted triazine comprising at least one monovalent amine substituent bonded directly through an amino nitrogen atom to a carbon atom of the triazine nucleus, the amine of said monovalent amine substituent being selected from the group consisting of members 2 through 6 above.

4,116,876

BORATED OXAZOLINES AS VARNISH INHIBITING DISPERSANTS IN LUBRICATING OILS

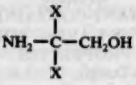
Stanley J. Brois, Westfield; Antonio Gutierrez, Hamilton Square, and Esther D. Winans, Colonia, all of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Jan. 28, 1977, Ser. No. 763,545

Int. Cl.[2] C10M *1/10, 1/50*

U.S. Cl. 252—49.6 **17 Claims**

1. A lubricating oil composition comprising a major amount of lubricating oil and a minor but dispersing amount of a sludge dispersing and varnish inhibiting oil-soluble borated oxazoline material containing from about 0.1 to 2.0 wt. % boron, wherein said oxazoline material is formed by the reaction of (A) a hydrocarbyl substituted C_4 to C_{10} dicarboxylic acid or anhydride, wherein said hydrocarbyl group is a polymer of C_2 to C_5 monoolefin, said polymer having a molecular weight of about 900 and 10,000; and (B) a 2,2-disubstituted-2-amino-1-alkanol having 2 to 3 hydroxy groups and containing a total of 4 to 8 carbons and represented by the formula:



wherein X is an alkyl, or hydroxy alkyl group, with at least one of the X substituents being a hydroxy alkyl group of the structure $-(CH_2)_nOH$, said oxazoline material having one to two oxazoline rings.

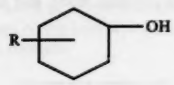
4,116,877

ELASTOMER COMPATIBLE SEAL SWELL ADDITIVE FOR AUTOMATIC TRANSMISSION FLUIDS, POWER TRANSMISSION FLUIDS AND HYDRAULIC STEERING APPLICATIONS

Edward Francis Outten; Jack Ryer, both of East Brunswick, and John E. Williams, Cranford, all of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Jul. 8, 1977, Ser. No. 813,893
Int. Cl.[3] C10M *1/46; 1/20*
U.S. Cl. 252—72 9 Claims

1. In a method of operating a hydraulic transmission having elastomer seals subject to deterioration and leakage, the improvement of using a transmission fluid comprising mineral oil containing at least a seal swelling amount of the combination of an organophosphite having the general formula $(RO)_3P$ wherein R is a hydrocarbyl group containing from 8 to 24 carbons and a phenol of the general formula



wherein R is a hydrocarbyl group of from 8 to 24 carbons; said organophosphite having a weight ratio to said phenol from 4:1 to 1:4, whereby the compatibility of said oil for said elastomer is enhanced.

4,116,878

DETERGENT COMPOSITION

Fritz Deutscher, Mannheim, and Robert Leitner, Ketsch, both of Fed. Rep. of Germany, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 584,306, Jun. 6, 1975, abandoned. This application Oct. 26, 1976, Ser. No. 735,365
Claims priority, application Luxembourg, Jun. 14, 1974, 70322
Int. Cl.[2] C11D *3/395, 7/54, 1/14*
U.S. Cl. 252—94 2 Claims

1. A detergent and bleaching composition having a reduced fabric damaging effect consisting essentially of

(a) from 2 to 20% by weight of an anionic detergent compound selected from the group consisting of the sodium and potassium salts of C_{12}–C_{18} alkylbenezenesulphonic acids, C_{10}–C_{24} alkylsulphuric acid esters, C_{10}–C_{20} olefinsulphonic acids, C_{12}–C_{18} acylisethionic acids and C_{12}–C_{18} acyltaurines;

(b) from 1 to 80% by weight of sodium or potassium monopersulphate;

(c) from 0.1 to 5% by weight of sodium or potassium bromide; and

(d) from 0.1 to 20% by weight of urea or acetamide; the weight ratio of the sodium or potassium monopersulphate to the sodium or potassium bromide being higher than 1:1, and the total composition having a pH of from 8 to 11.

4,116,879

QUATERNARY HYDROXYALKYL TERTIARY AMINE BASES AS POLYURETHANE CATALYSTS

Ibrahim S. Bechara, Boothwyn; Felix P. Carroll, Chester; Rocco L. Mascioli, Media, all of Pa., and John R. Panchak, Wilmington, Del., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 497,194, Aug. 14, 1974, Pat. No. 3,988,267, which is a continuation-in-part of Ser. No. 377,447, Jul. 9, 1973, Pat. No. 3,872,687. This application Aug. 10, 1976, Ser. No. 713,307
Int. Cl.[2] B01J *31/02, 27/24;* C08J *9/00;* C07C *87/30*
U.S. Cl. 252—426 2 Claims

1. A polyurethane catalyst composition for the polymerization of a polyol and an organic polyisocyanate which comprises a mixture of a tertiary amine selected from the group consisting of trimethylamine, triethylamine, tripropylamine, triisobutylamine and mixtures thereof and a quaternary hydroxyalkyl tertiary amine base prepared by reacting substantially stoichiometric amounts of water or a carbinol selected from the group consisting of methanol, ethanol, benzyl alcohol, furfuryl alcohol, allyl alcohol, phenol, octylphenol, nonylphenol, methylphenol, methoxyphenol, ethoxyphenol, 3-diethylamino phenol, naphthol, resorcinol, 1,4-hydroquinone, chlorophenols, chloronaphthols and p,p'-dihydroxydiphenyldimethylmethane; an alkylene oxide selected from the group consisting of propylene oxide, ethylene oxide, 1,2-butylene oxide, 1,2-pentene oxide, styrene oxide, butadiene epoxide, diepoxides prepared from p,p'-dihydroxydiphenyldimethylmethane and epichlorohydrin, an olefin oxide having 9–14 carbon atoms and mixtures thereof; and a tertiary amine selected from the group consisting of trimethylamine, triethylamine, tripropylamine, triisobutylamine and mixtures thereof, wherein the tertiary amine in said composition is present in a catalytic amount of up to 50% by weight of the composition.

4,116,880

SOLID CATALYSTS BASED ON FLUORINATED GRAPHITE

George A. Olah, Shaker Heights, Ohio, assignor to Produits Chimiques Ugine Kuhlmann, Clichy, France

Filed Jun. 16, 1977, Ser. No. 807,014
Int. Cl.[2] B01J *27/12*
U.S. Cl. 252—429 R 9 Claims

1. A catalyst composition for hydrocarbon transformations comprising a fluorinated graphite having a fluorine to carbon atomic ratio of from about 0.1 to 1 having bonded thereto from between about 5 to about 50 percent by weight of the total catalyst composition of at least one Lewis acid selected from halides of the elements of Group II-A, III-A, IV-B, V or VI-B of the Periodic Table.

4,116,881

GAS-PURIFYING COMPOSITION AND METHOD OF PRODUCING IT

Tsuneo Shibata, Yamatokoriyama; Masao Maki, Nabari; Masao Suzuki, Nara, and Hidehiko Kawabe, Kashiwara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Division of Ser. No. 516,869, Oct. 21, 1974, Pat. No. 4,025,603. This application Feb. 24, 1977, Ser. No. 771,677
Claims priority, application Japan, Oct. 19, 1973, 48-118281; Dec. 18, 1973, 48-142889; Dec. 28, 1973, 48-2897
Int. Cl.[2] B01J *23/02, 23/04, 27/02, 27/08*
U.S. Cl. 252—440 6 Claims

1. A granulated gas-purifying composition comprising calcium sulfate and potassium permanganate.

4,116,882

METHOD FOR THE FORMATION OF ALUMINA SPHERES

Larry L. Bendig; Cathy S. Siemsen, and Donald E. Stowell, all of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Dec. 14, 1977, Ser. No. 860,369
Int. Cl.[2] B01J *21/04*
U.S. Cl. 252—448 5 Claims

1. An improved method for forming high purity alumina spheres by dropping alumina slurry through a hydrocarbon filled column to form spheres said column having an aqueous ammonia layer at the lower portion thereof, said ammonia providing a set to the spheres allowing them to maintain spherical form, the improvement comprising forming alumina spheres having from 80–85% of the pore volume of said spheres in the range of from about 35 angstroms to about 65 angstroms, by peptizing an alumina slurry obtained from the hydrolysis of aluminum alkoxides, said slurry containing from 10 to 20 weight percent Al_2O_3, with an acid selected from a group such as acetic acid, formic acid, and nitric acid and allowing the slurry thus formed to age until a viscosity of from about 200 to about 600 centipoise is obtained, prior to dropping through a hydrocarbon filled column.

4,116,883

CATALYST SUPPORT COATING SLURRY AND COATINGS

James F. Rhodes, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 26, 1975, Ser. No. 553,106
Int. Cl.[2] B01J *21/04*
U.S. Cl. 252—463 12 Claims

1. A ceramic support coating slurry resistant to gel formation and adapted to form a porous, substantially uniform, thermally durable and adherent coating on a refractory ceramic substrate, consisting essentially of very fine grained gamma alumina having a size not larger than about 200 A in the amount of about 5 to 70 weight percent of the solids and one of the active alumina precursors consisting of alpha alumina monohydrate and pseudoboehmite in the amount of about 30 to 95 weight percent of the solids, said alumina and precursor being suspended in sufficient deionized water to form a slurry having the desired application characteristics, said solids being present in an amount of about 30–36% by weight of said slurry, said gamma alumina serving to disperse said precursor without the need for peptizing agents and functioning as a binder to give coherence within the coating and adherence to the substrate.

4,116,884

OXIDIZING CATALYZER

Tadayoshi Hayashi, Niiza; Yoshiaki Takagi, Kawagoe; Tetsuo Toizume, Takatsuki, and Masakazu Umeda, Nara, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 2, 1977, Ser. No. 821,282
Claims priority, application Japan, Aug. 6, 1976, 51-93138
Int. Cl.[2] B01J *23/72, 23/86, 21/04, 21/06*
U.S. Cl. 252—470 5 Claims

1. An oxidizing catalyst comprising a ternary alloy consisting essentially of 70–45% Ni, 30–55% Co and 0.5–10% Cr.

4,116,885

ANIONIC SURFACTANT-CONTAINING DETERGENT COMPOSITIONS HAVING SOIL-RELEASE PROPERTIES

Donna M. Derstadt, and Douglas W. Moeser, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sep. 23, 1977, Ser. No. 836,127
Int. Cl.[2] C11D *1/14, 3/065, 3/20*
U.S. Cl. 252—532 23 Claims

1. A laundry detergent composition comprising:

(a) from about 0.15% to about 25% by weight of a soil-release polymer comprising ethylene terephthalate and polyethylene oxide terephthalate at a molar ratio of ethylene terephthalate to polyethylene oxide terephthalate of from about 50:50 to about 90:10, said polyethylene oxide terephthalate containing polyethylene oxide linking units having a molecular weight of from about 600 to about 5,000; and

(b) from about 5% to about 95% of compatible anionic surfactants selected from the group consisting of nonethoxylated C_8–C_{18} alcohol sulfates, C_9–C_{13} alcohol sulfates condensed with from about 1 to 30 moles of ethylene oxide, C_{14}–C_{20} alcohol sulfates condensed with from about 4 to 30 moles of ethylene oxide, and mixtures thereof;

wherein from 0 to about 10% of said detergent composition constitutes other types of anionic surfactants and, further, wherein from 0 to about 25% of the total anionic surfactant components contained in said composition is an incompatible surfactant selected from the group consisting of linear alkylbenzene sulfonates having from about 8 to 18 carbon atoms in the alkyl group, C_{14}–C_{20} alcohol sulfates condensed with from about 1 to 3 moles of ethylene oxide, and mixtures thereof.

4,116,886

MOISTURE CURABLE EPOXY COMPOSITIONS CONTAINING DICARBONYL CHELATES

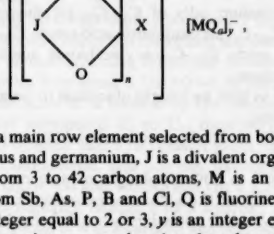
James A. Cella, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed May 20, 1977, Ser. No. 798,783
Int. Cl.[2] C08L *63/00*
U.S. Cl. 528—88 16 Claims

1. A moisture curable epoxy composition comprising

(A) an epoxy resin polymerizable to the high molecular weight state selected from epoxy monomer, epoxy prepolymer, oxirane containing organic polymer and mixtures thereof, and

(B) an effective amount of a moisture sensitive dicarbonyl chelate of the formula,



where X is a main row element selected from boron, silicon, phosphorus and germanium, J is a divalent organic radical having from 3 to 42 carbon atoms, M is an element selected from Sb, As, P, B and Cl, Q is fluorine or oxygen, *n* is an integer equal to 2 or 3, *y* is an integer equal to 1 or 2, and *a* is an integer equal to 4 to 6 or the valence of M.

4,116,887
ANIONIC POLYMERIZATION

Jean-Marie Lehn, Strasbourg; Francois Schué, Lutzelhouse; Sylvia Bolleau, Paris; Bernd Kaempf, Strasbourg; Alain Andre Cau, Chateauneuf sur Loire; Jean Robert Moinard, Vert le Petit, and Serge Fernand Raynal, Villejuif, all of France, assignors to Societe Nationale des Poudres et Explosifs, France

Division of Ser. No. 401,119, Sep. 26, 1973, Pat. No. 3,890,278. This application Jan. 9, 1975, Ser. No. 539,729

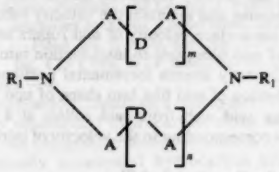
Claims priority, application United Kingdom, Oct. 3, 1972, 45482/72; Jul. 30, 1973, 36257/73

Int. Cl.[2] C08G *65/12, 63/10, 75/06, 77/08*

U.S. Cl. 260—2 A **28 Claims**

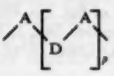
1. A process for the polymerization or copolymerization of heterocyclic monomers through ring opening which comprises polymerizing or copolymerizing at least one heterocyclic monomer structurally capable of anionic polymerization in a non-polar or slightly polar organic solvent medium in the presence of an anionic initiator and of a macro-heterocyclic complexing agent of the general formula I

(I)

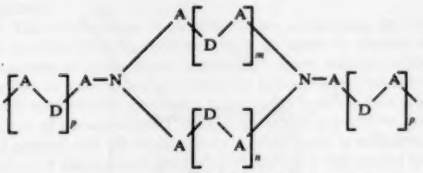


in which:

R_1 is a hydrogen atom or a hydrocarbon group or an alkoxycarbonyl group, or the two R_1 together can form a group of the general formula:



or



wherein A is a hydrocarbon group, D is an oxygen or sulfur atom or a hydrocarbon group, with the proviso that at least two of the D groups are oxygen atoms or sulfur atoms and that if R_1 is a hydrogen atom, a hydrocarbon group or an alkoxycarbonyl group, one of the two D groups is oxygen or sulfur and the other is oxygen, and n and p are integers from 1 to 3 and m is 2 or 3.

4,116,888
PROCESS FOR PRODUCING FLUORINATED COPOLYMER HAVING ION-EXCHANGE GROUPS

Hiroshi Ukihashi, Tokyo; Tatsuro Asawa, Yokohama; Masaaki Yamabe, Machida, and Haruhisa Miyake, Yokohama, all of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed Nov. 8, 1976, Ser. No. 739,728

Int. Cl.[2] C08F *2/06*

U.S. Cl. 521—31 **6 Claims**

1. A fluorinated copolymer consisting essentially of 1–50 mole % of a functional fluorovinyl monomer having the formula:

$$CF_2=CX\text{-}(OCF_2CFY\text{-})_l\text{—}(O)_m\text{-}(CFY')_n\text{-}A$$

wherein l is 0 to 3; m is 0 or 1; n is 0 to 12; X represents —F or $-CH_3$; Y and Y' represent —F or a $C_{1\text{-}10}$ perfluoroalkyl group; A represents —CN, COF, —COOH, $COOR_1$, COOM, or $CONR_2R_3$; R_1 represents a $C_{1\text{-}10}$ alkyl group; R_2 and R_3 represent —H or $-R_1$; M represents an alkali metal atom or a quaternary ammonium group;

and 50–99 mole % of a copolymerizable fluorinated ethylenically unsaturated monomer, characterized by having the combination of properties of a T_Q greater than 150° C. and an ion exchange capacity of 0.5 to 4 meq/g of dry polymer;

and which is produced by copolymerizing the constituent monomer in 0 to 10 moles of an inert organic solvent per 1 mole of said functional monomer under a pressure greater than 6 Kg/cm^2.

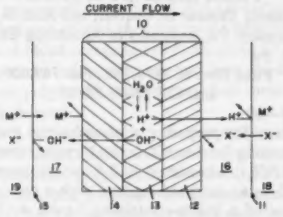
4,116,889
BIPOLAR MEMBRANES AND METHOD OF MAKING SAME

Frederick P. Chlanda, Rockaway; Lester T. C. Lee, Parsippany, and Kang-Jen Liu, Somerville, all of N.J., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Aug. 19, 1976, Ser. No. 715,765

Int. Cl.[2] C08J *5/22, 5/24;* **C25D** *21/22*

U.S. Cl. 521—27 **17 Claims**



1. A method for preparing bipolar membranes which comprises:

coating on (a) an ion exchange membrane, a fluid mixture of a dispersion of (b) particles of an ion exchange resin in (c) a matrix polymer where (b) has a charge opposite to the charge of (a); and

bonding said membrane and mixture to form a unitary bipolar membrane structure.

5. A method for preparing bipolar membranes which comprises coating on a membrane which is comprised of an inert polymeric matrix and an anion exchange crosslinked polyelectrolyte, a dispersion of cation exchange resin particles having a particle size of less than one micron diameter in a solution of a matrix polymer, and evaporating the solvent from the cation exchange resin solution to form a unitary bipolar membrane structure.

15. The product produced by the method of claim 1.

4,116,890
PHOSPHONATED FLUOROTELOMERS

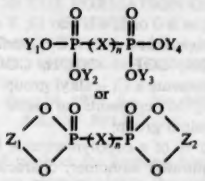
James Chen-Shang Fang, Media, Pa., assignor to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 663,071, Mar. 2, 1976, abandoned. This application Feb. 2, 1977, Ser. No. 764,174

Int. Cl.[2] C25B *13/00*

U.S. Cl. 521—28 **22 Claims**

1. A fluorotelomer represented by the structure



where Y_1, Y_2, Y_3 and Y_4 are the same or different and are alkyl radicals of 1–10 carbon atoms or alkyl radicals of 1–10 carbon atoms substituted with at least one alkyl radical of 1–4 carbon atoms;

X is a homo- or cotelomeric moiety of at least one of

(a) one or more monoethylenically unsaturated monomers fully substituted with fluorine atoms or with a combination of at least one fluorine atom and chlorine or bromine atoms, and

(b) a perfluoroalkyl vinyl ether whose alkyl group contains 1–10 carbom atoms;

Z_1 and Z_2 are the same or different and are alkylene radicals of 1–10 carbon atoms, or alkylene radicals of 1–10 carbom atoms substituted with at least one alkyl radical of 1–4 carbon atoms, or Z_2 is made up of Y_1 and Y_2; and n is 2–500.

4,116,891

CATALYTIC PROCESS FOR THE PREPARATION OF PHOSPHAZENE POLYMERS

Ronald L. Dieck; Thomas B. Garrett, and Alan B. Magnusson, all of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Dec. 6, 1976, Ser. No. 747,626
Int. Cl.[2] C08G *79/02*
U.S. Cl. 521—89 **17 Claims**

1. A process for preparing a phosphazene polymer which comprises heating for 5 to 600 hours a cyclic compound of the formula $(NPCl_2)_y$ wherein y is 3,4, or mixtures thereof at 150°–250° C. in an inert atmosphere with a catalytically sufficient amount of a halide-containing Lewis acid catalyst selected from the group halides of Group I*b*, halides of Group II*b*, halides of Group III*b*, halides of Group IV*b*, actinide halides, halides of Group IV*a*, halides of Group V*a*, halides of Group V*b*, halides of Group VI*b*, halides of Group VI*a*, halides of Group VII*a*, halides of Group VIII, lanthanide halides and mixtures thereof; a non-halide containing Lewis acid catalyst selected from the group metal alkyls, acidic chalcides, and mixtures thereof; or mixtures thereof.

4,116,892

PROCESS FOR STRETCHING INCREMENTAL PORTIONS OF AN ORIENTABLE THERMOPLASTIC SUBSTRATE AND PRODUCT THEREOF

Eckhard C. A. Schwarz, Neenah, Wis., assignor to Biax-Fiberfilm Corporation, Neenah, Wis.

Continuation-in-part of Ser. No. 563,623,. This application Sep. 17, 1975, Ser. No. 614,018
Int. Cl.[2] C08L *67/06, 23/12;* B29D *27/00;* B29C *17/02*
U.S. Cl. 521—62 **16 Claims**

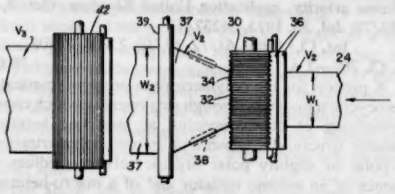
7. A process for bi-axially stretching incremental portions of a film formed of synthetic thermoplastic material selected from the group consisting of a thermoplastic orientable polymer or a blend of thermoplastic orientable polymers in which there is admixed an incompatible second phase material selected from the group consisting of an incompatible polymer or inorganic material which comprises:

(a) introducing said film into a nip of interdigitating rollers having grooves parallel to the axis of said rollers;

(b) controlling the velocity of introduction of said film into said nip to assume and maintain the velocity substantially identical to the surface velocity of said rollers to prevent slipping of said film and thereby longitudinally stretch incremental portions of said film by deflection of said film into the shape of said grooves;

(c) withdrawing said film from said rollers at a velocity greater than the rotational velocity of said rollers;

(d) introducing said film into a nip of interdigitating rollers having grooves substantially perpendicular to the axis of said rollers;



(e) controlling the velocity of introduction of said web into said nip to assume and maintain the velocity substantially identical to the surface velocity of said rollers to prevent narrowing of said film prior to introduction into said nip thereby to laterally stretch incremental portions of said web by deflection of said film into shape of said grooves;

(f) withdrawing said web from said rollers at a velocity substantially corresponding to the velocity of introduction and;

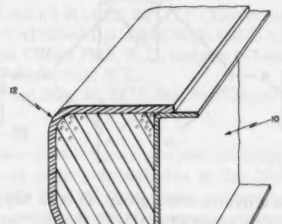
(g) collecting the thus stretched film.

4,116,893

IMPACT ENERGY-ABSORBING URETHANE FOAM

Kirby E. L. Flanagan, Rochester, N.H., assignor to McCord Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 481,498, Jun. 21, 1974, abandoned. This application Dec. 2, 1976, Ser. No. 746,826
Int. Cl.[2] C08G *18/63, 18/65*
U.S. Cl. 521—137 **3 Claims**



1. An impact energy-absorbing urethane foam made from the following formulation:

	Parts by Weight
Polymer Polyol	70 to 90
Cross linker	10 to 30
Water	1 to 5
Prepolymer	To yield 90–115% Index
Catalyst	0 to 2

wherein:

said polymer polyol having a molecular weight in the range of 4000 to 8000 and comprising in the range of 2 to 6 parts

of a poly (C_1–C_4 oxyalkylene) triol reacted with one part of a vinyl aromatic/olefinic C_2–C_6 nitrile monomer mixture;

said crosslinker is a polyol having a functionality in the range of 2 to 6 and an equivalent weight in the range of 50 to 150;

said prepolymer is a reaction product of (a) an aromatic diisocyanate selected from the group consisting of MDI and TDI and (b) a polyol selected from the group consisting of a 100 to 1000 molecular weight triol and a 100 to 200 molecular weight ether glycol and has a free isocyanate content in the range of 20 to 35 percent; and

said urethane foam being prepared in a closed mold at a pack factor in the range of 1.5 to 8 and having a density in the range of 5 to 20 lbs./ft.^{3}, a specific energy at 50% C/D greater than 25 in.-lbs./in.^{3}, a temperature index −20°/140° F. of less than 2.5 and at least 90% recovery at 70° F. after multiple impact.

4,116,894

COMPOSITIONS AND METHOD FOR ENHANCING ELECTRICAL LIFE OF COPOLYMERS

James A. Lentz, Penfield, and George J. Safford, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 1, 1976, Ser. No. 701,711

Int. Cl.^{2} C08K *5/19;* **C08L** *23/02, 23/26*

U.S. Cl. 521—94 **15 Claims**

1. A composition containing a copolymer of butadiene and a terminally unsaturated hydrocarbon nitrile having improved electrical life comprising about 1.0 percent to about 12.0 percent terminally unsaturated hydrocarbon nitrile having the formula R—C≡N where R is an unsaturated, straight or branched chain hydrocarbon, the balance of the copolymer being butadiene and a sufficient amount of conductivity control agent to produce a composition having a resistivity from about 10^7 ohm-cm to about 5.0×10^{11} ohm-cm, the conductivity control agent being selected from the group consisting of organic dyes, organic pigments, organic salts, polyelectrolytes, inorganic salts, inorganic pigments and charge transfer complexes or materials which produce charge transfer complexes with the copolymer, the conductivity control agent being solubilized in the copolymer and in the composition formed therewith.

5. The composition of claim **1** further comprising the reaction product of the copolymer with an agent to convert the copolymer to an elastomer, a polymeric foam material, a polymer film or a cross-linked copolymer having improved electrical life wherein the terminally unsaturated hydrocarbon nitrile content of the copolymer is from about 1.0 percent to about 12.0 percent and the conductivity control agent is sufficient to produce in the reaction product a resistivity at the desired level within the range of about 10^7 to about 5.0×10^{11} ohm-cm.

6. The composition of claim **5** wherein the agent to convert the copolymer to an elastomer, a polymeric foam material, a polymer film or a crosslinked copolymer is a dibasic acid which forms an ester with the said copolymer as the reaction product, the reaction product having improved electrical life.

4,116,895

PUNCTURE SEALANT COMPOSITION

Kunio Kageyama, Yokohama, and Mituharu Iwakura, Hiratsuka, both of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed May 31, 1977, Ser. No. 802,046

Claims priority, application Japan, Jun. 7, 1976, 51-66225; May 10, 1977, 52-52586

Int. Cl.^{2} B60C *21/08*

U.S. Cl. 260—5 **18 Claims**

1. A puncture sealant for a tubeless pneumatic tire comprising the reaction product of (a) 100 parts by weight in terms of the solid content of an aqueous butyl rubber emulsion, (b) 50 to 500 parts by weight in terms of the solid content of at least one aqueous saturated hydrocarbon polymer emulsion, said saturated hydrocarbon polymer having an average number molecular weight of from 500 to 100,000 and being derived from at least one monoolefin having 4 to 6 carbon atoms, (c) 1 to 15 parts by weight of a crosslinking agent for the rubber and (d) a crosslinking activator.

4,116,896

FOUNTAIN COMPOSITIONS FOR USE IN LITHOGRAPHIC PRINTING COMPRISING AQUEOUS SOLUTIONS OF POLYACRYLAMIDE BASED POLYMERS AND BLENDS OF POLYACRYLAMIDE AND POLYACRYLIC ACID WITH AN ORGANIC CHELATING AGENT

Walter L. Garrett, Freeland; Ralph E. Friedrich, and Ralph G. Czerepinski, both of Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 586,452, Jun. 12, 1975, abandoned. This application Sep. 29, 1976, Ser. No. 727,825

Int. Cl.^{2} C08L *1/28;* **B41M** *3/00;* **B41N** *3/00*

U.S. Cl. 260—17 R **26 Claims**

1. In a fountain solution for dampening a lithographic printing plate during a press run, of the type containing (1) polyvalent metal cations, (2) at least about 97 weight percent solvent, said solvent containing at least one lower alkyl mono- or polyhydric alcohol or glycol ether having a molecular weight of about 170 or less, and at least about 75 volume percent water, and (3) from about 0.001 to about 0.5 weight percent avtive polymer component, the active polymer component being selected from the group consisting of

(a) a polyacrylamide-based polymer wherein from about 3 to about 70 percent of the carbonyl sites are carboxyl groups, and the balance of said sites are amide moieties,

(b) a physical blend comprised of from about 97 to about 30 weight percent polyacrylamide and from about 3 to about 70 percent polyacrylic acid or an alkali metal or ammonium salt thereof,

(c) a physical blend comprised of polyacrylamide, or polyacrylic acid or an alkali metal or ammonium salt thereof, and at least one polyacrylamide-based polymer as described in (a), said polymers being employed in proportions such that of the total carbonyl sites present in the blend, from about 3 to about 70 percent are carboxyl groups and the balance are amide moieties,

(d) a mixture of any two or more of the foregoing, (a)– (c) the weight average molecular weight of each of said polyacrylamide-based polymer, polyacrylamide, and polyacrylic acid or salt thereof being in the range of from about 5000 to about 1,000,000, and

(e) a co-mixture of one or more of the foregoing (a)–(d) with up to about 30 weight percent hydroxypropyl methylcellulose based on the total weight of the comixture, said hydroxypropyl methylcellulose being of a type which produces a 2 weight percent aqueous solution having a viscosity of from about 1 to about 100 cP when measured according to ASTM Method D 2363-72,

the solution being further characterized by a pH of less than about 7, the improvement which comprises: providing in the composition, an effective amount of at least one organic chelating agent for the polyvalent metal cations, said chelating agent being substantially inert with respect to the active polymer component and further characterized

(A) by a 1:1 stability constant with zinc of at least about $10^{7.5}$ at 25° C,

(B) by a solubility in the water/alcohol solvent system at 25° C and at a pH of from about 3 to about 7, of at least 0.001 mole per liter, and

(C) by its property of forming with the polyvalent metal cations, a complex having a solubility in the water/alcohol solvent system at 25° C and at a pH of from about 3 to about 7 of at least 0.001 mole per liter.

4,116,897

COMPOUNDED PLASTIC SYSTEM

Andor Huszár; Géza Székely; Istán Rusznak; Lajos Trézl; György Bertalan; Ilona Zaoui nee Serfózó, and Imre Molnar, all of Budapest, Hungary, assignors to Tiszai Vegy Kombinat, Leninvaros, Hungary

Continuation-in-part of Ser. No. 522,357, Nov. 11, 1974, abandoned. This application Oct. 1, 1976, Ser. No. 728,762

Int. Cl.[2] C08K *5/00*

U.S. Cl. 260—17.4 R **2 Claims**

1. In a compounded plastic system containing 3 to 90% by weight of a crystalline polyolefine, 0.4 to 80% by weight of a non-crystalline polyolefine, 25 to 90% by weight of a pigment and/or filling agent, 0.5 to 10% by weight of surfactants, and optionally other polymers, the improvement that the system contains two surfactants of different HLB-values, the one surfactant having a HLB-value lower than 9 and the other surfactant having a HLB-value higher than 9, both surfactants being heat-resistant up to at least 160° C.

4,116,898

NON-THROMBOGENIC ARTICLES

Betty J. Dudley, Durham, and Joel L. Williams, Cary, both of N.C., assignors to Becton, Dickinson and Company, Rutherford, N.J.

Filed Jan. 31, 1977, Ser. No. 764,474

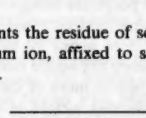
Int. Cl.[2] C08L *5/10*

U.S. Cl. 260—17.4 R **1 Claim**

1. An article for use in association with whole blood, which comprises;

a solid polymeric resin substrate; and

a compound of the formula:



wherein A represents the residue of sodium heparin after removal of the sodium ion, affixed to said substrate said resin being polyethylene.

4,116,899

INCREASING ABSORBENCY OF POLYMERIC COMPOSITIONS BY CURING

George F. Fanta, Peoria, and William M. Doane, Morton, both of Ill., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Aug. 15, 1977, Ser. No. 824,776

Int. Cl.[2] C08L *1/02, 1/08, 3/02*

U.S. Cl. 260—17.4 GC **14 Claims**

1. A method for producing absorbent polymeric compositions comprising the following steps:

a. providing an aqueous dispersion of a physical mixture of a polyhydroxy polymer and a carboxylate-containing synthetic polymer, wherein said synthetic polymer is characterized by the property of remaining water dispersible upon initial drying of the aqueous dispersion of said physical mixture;

b. drying said aqueous dispersion to form water-dispersible dry solids of said polyhydroxy polymer and said synthetic polymer; and

c. curing said dry solids by treatment with a combination of time and temperature sufficient to render said solids non-dispersible and capable of swelling upon absorption of aqueous fluids.

4,116,900

CATHODIC ELECTROCOATING RESIN SYSTEM FROM POLYEPOXIDE, POLYAMINE, AND MONOEPOXIDE

William J. Belanger, Louisville, Ky., assignor to Celanese Polymer Specialties Company, Louisville, Ky.

Continuation of Ser. No. 715,266, Aug. 18, 1976, abandoned. This application Jan. 23, 1978, Ser. No. 871,262

Int. Cl.[2] C08G *59/16;* **C25D** *13/06*

U.S. Cl. 260—18 EP **9 Claims**

1. A resinous composition comprising the reaction product of

(A) a polyepoxide resin derived from a dihydric phenol and an epihalohydrin, said polyepoxide resin having a 1,2-epoxide equivalent weight of about 400 to about 4000; and

(B) a polyamine having at least 2 amine nitrogen atoms per molecule, at least 3 amine hydrogen atoms per molecule and no other groups reactive with epoxide groups; followed by reaction with

(C) a monoepoxide which contains one 1,2-epoxide group and no other groups reactive with amine groups, said monoepoxide having about 8 to 24 carbon atoms per molecule and being selected from the group consisting of epoxidized unsaturated hydrocarbons, epoxidized monoalcohol esters of unsaturated fatty acids, monoglycidyl ethers of monohydric alcohols and monoglycidyl esters of monocarboxylic acids,

wherein about 1 mol of (B) is reacted with each epoxide equivalent of (A), about 2 to about 6 mols of (C) are reacted per each mol of (A) and

wherein said reaction product has a weight per active nitrogen of about 200 to about 600.

4,116,901

LOW TEMPERATURE CURING ESTER COPOLYMERS-PHENOLIC CONDENSATES

Kazys Sekmakas, Chicago, and Raj Shah, Schaumburg, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Dec. 15, 1977, Ser. No. 860,907

Int. Cl.[2] C09D *3/76*

U.S. Cl. 260—19 UA **19 Claims**

1. A low temperature curing epoxy ester copolymer-phenolic condensate comprising an epoxy ester of a resinous polyepoxide having an epoxy functionality in the range of from 1.4 to about 2.0 with at least about 0.2 moles of ethylenically unsaturated monocarboxylic acid containing conjugated ethylenic unsaturation per epoxy equivalent in the polyepoxide, and at least about 0.5 mole of ethylenically unsaturated monocarboxylic fatty acid containing nonterminal nonconjugated ethylenic unsaturation per epoxy equivalent in the polyepoxide, said epoxy ester being substantially free of epoxy functionality and being copolymerized in organic solvent solution with from about 15% to about 150%, based on the weight of the epoxy ester, of monoethylenically unsaturated monomers containing terminal ethylenic unsaturation to form a nongelled, solvent-soluble, copolymer possessing residual ethylenic unsaturation adapting the same for an oxidative cure, said monomers including from about 3% to about 20%, based on the weight of the copolymer, of carboxy-functional monomers selected from acrylic acid, methacrylic acid, fumaric acid and maleic acid, and said copolymer being precondensed with from 5% to 40% of a phenolic resin, based on the weight of the copolymer.

4,116,902

POLYURETHANE-MODIFIED ALKYD RESIN

Robert Richard Harris, Burnham, and Warren John Pollack, Carpentersville, both of Ill., assignors to International Minerals & Chemical Corp., Libertyville, Ill.

Filed Oct. 5, 1977, Ser. No. 839,718

Int. Cl.[2] C09D *3/64, 5/08*

U.S. Cl. 260—22 TN **1 Claim**

1. An air-drying, water-soluble, polyurethane-modified

alkyd resin having superior corrosion resistance and hardness obtained by the steps of:

(a) (1) forming an alkyd resin by melting together at 175° F. a mixture of trimethylpentanediol 1170 parts, linoleic acid 1848 parts, and phthalic anhydride 1465 parts,

(2) with agitation adding thereto trimethylolethane 698 parts, dimethylolpropionic acid 567 parts, and dibutyl tin oxide 6.5 parts,

(3) heating the mixture slowly under a nitrogen blanket to 210° C. until an acid number of 52–57 is obtained,

(4) cooling the mixture to 160° C. and adding ethyl benzene 517 parts, cooling to 82° F. and adding methyl ethyl ketone 339 parts, and cooling to 65° C.,

(b) adding thereto toluene diisocyanate 730 parts over a two-hour period, maintaining the temperature at 82° C. or below, then heating to 100°–105° C. for about 1.5 hours, and then diluting with inert solvent.

4,116,903
ALKYD-SUPPORTED EMULSION INTERPOLYMERS AND METHODS FOR PREPARATION

Dennis E. Lietz, Western Springs, and Layton F. Kinney, Chicago, both of Ill., assignors to P.R.A. Laboratories Incorporated, Chicago, Ill.

Filed Mar. 2, 1977, Ser. No. 773,547
Int. Cl.[2] C09D *3/66, 5/02*
U.S. Cl. 260—22 CB **51 Claims**

1. A storage stable, emulsifier free, pourable emulsion comprising on a 100 weight percent total weight basis:

(A) from about 10 to 65 weight percent of an interpolymer system, and

(B) the balance up to 100 weight percent thereof being a carrier liquid selected from the group consisting of water and an organic water miscible liquid,

(C) said interpolymer system comprising on a 100 weight percent total non-volatile resin solids basis

(1) from about 5 to 90 weight percent of preformed, water-soluble alkyd resin which is free from unsaturated dibasic acid material selected from the group consisting of maleic acid, maleic anhydride, fumaric acid and itaconic acid and which has been pre-neutralized to a starting aqueous alkyd resin solution pH ranging from about 6 to 9, and

(2) the balance up to 100 weight percent thereof being at least one in situ emulsion polymerized vinyl monomer,

(D) said carrier liquid comprising on a 100 weight percent total carrier liquid basis:

(1) from 0 to about 50 weight percent of said organic water miscible liquid, and

(2) the balance up to 100 weight percent thereof being water.

4,116,904
WATER BASED ALKYD RESIN PRIMER

Monica Harish Verma, Troy, Mich., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 738,855, Nov. 4, 1976, abandoned. This application Dec. 7, 1977, Ser. No. 858,183
Int. Cl.[2] C09D *3/64, 5/08*
U.S. Cl. 260—22 R **5 Claims**

1. An aqueous primer composition comprising 5–50% by weight of a film-forming binder and 50–95% by weight of an aqueous medium; wherein the binder consists essentially of

an alkyd resin which is the esterification product of soya oil fatty acids, phthalic acid, trimellitic anhydride and trimethylol propane having an acid number of 20–100; and

the composition contains pigment in a pigment to binder weight ratio of about 300/100 to 10/100 in which the pigment is a mixture of talc, barytes and zinc/calcium molybdate and

about 0.05–1.0% by weight, based on the weight of the composition, of an anionic polyelectrolyte dispersant;

the composition containing sufficient ammonia or an amine to provide the composition with a pH of 6.5–8.5.

4,116,905
WATER-BASED COATING COMPOSITION CONTAINING POLYVINYL CHLORIDE

Kenneth G. Davis, Pittsburgh, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 585,938, Jun. 11, 1975, abandoned. This application Mar. 28, 1977, Ser. No. 782,201
Int. Cl.[2] C08K *3/18;* **C08L** *27/06, 67/08*
U.S. Cl. 260—22 CB **11 Claims**

1. A water-based coating formulation consisting essentially of powdered polyvinyl chloride dispersed in a solution of a water-dilutable resin, having functional carboxyl or hydroxy groups, selected from the group consisting of an alkyd resin, an acrylic resin, a mixture of an acrylic resin and an aminoplast, a mixture of an acrylic resin and a 1,2-epoxy resin, and a mixture of an acrylic resin, a 1,2-epoxy resin, and a phenolic resin, water-solubilized with ammonia, NH_4OH or an amine solubilizer, in water, a mixture of water and an alcohol or ether alcohol, or a mixture of water, alcohol, and ether alcohol; the weight ratio of polyvinyl chloride to water-dilutable resin being between 15:1 and about 1:1.

4,116,906
COATINGS FOR PREVENTING REFLECTION OF ELECTROMAGNETIC WAVE AND COATING MATERIAL FOR FORMING SAID COATINGS

Ken Ishino, Nagareyama, and Takashi Watanabe, Tokyo, both of Japan, assignors to TDK Electronics Co., Ltd., Tokyo, Japan

Filed Jun. 8, 1977, Ser. No. 804,784
Claims priority, application Japan, Jun. 16, 1976, 51-74640[U]
Int. Cl.[2] C09D *5/23, 5/32*
U.S. Cl. 260—22 A **7 Claims**

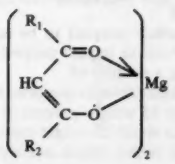
1. Coatings for preventing a reflection of electromagnetic waves on iron structures, comprising 20–260 parts by weight of a ferrimagnetic ferrite powder having a particle size of 1–300μ selected from the group consisting of compounds having the formula MFe_2O_4 in which M is a bivalent metal selected from the group consisting of Mn, Ni, Co, Mg, Cu, Zn, and Cd; and 40–680 parts by weight of an iron powder having a particle size of 1–20μ dispersed in 100 parts by weight of a film forming polymer.

4,116,907
CHLORINE-CONTAINING RESIN COMPOSITIONS

Tomoo Shiohara; Takayoshi Matsunaga, both of Kyoto, and Mikihiko Horioka, Kobe, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 13, 1977, Ser. No. 787,118
Claims priority, application Japan, Aug. 2, 1976, 51-92671; Aug. 3, 1976, 51-93076
Int. Cl.[2] C08K *3/34*
U.S. Cl. 260—23 XA **8 Claims**

1. A chlorine-containing resin composition comprising a chlorine-containing resin and, as thermal stabilizers for the chlorine-containing resin, the combination of (1) at least one magnesium diketone complex which is represented by the formula



wherein R_1 represents a p-chlorophenyl group, a phenyl group,

or a methyl group, and R_2 represents a p-chlorophenyl group, a phenyl group, a methyl group or an ethoxy group, (2) at least one of (a) a monohydric acyclic or cyclic alcohol having 8 to 18 carbon atoms, a dihydric alcohol represented by the formula OH—$(CH_2)_n$—OH wherein *n* is an integer of 6 or more, a polyhydric alcohol or a mono- or di-ester of said polyhydric alcohol having at least one hydroxyl group, or (b) a monovalent mercaptan or mercaptide having 3 to 18 carbon atoms, a divalent mercaptan or mercaptide having 5 to 12 carbon atoms, or a polyvalent mercaptan or mercaptide, and (3) at least one of a calcium silicate, a calcium aluminate or a calcium titanate, each obtained by a calcination method and being anhydrous.

4,116,908
PROCESS FOR THE PREPARATION OF A MASTER MIXTURE FOR A POWDER COMPOSITION WITH A POLYVINYL CHLORIDE BASE

Guy Charles Emery, 27380 - Radepont Par Fleury-sur-Andelle, France

Continuation-in-part of Ser. No. 449,080, Mar. 7, 1974, abandoned. This application Feb. 26, 1976, Ser. No. 661,532

Claims priority, application France, Mar. 8, 1973, 73.08347; Mar. 8, 1973, 73.08348

Int. Cl.² C08K *5/00, 9/12*

U.S. Cl. 260—23 XA **5 Claims**

1. A process for the preparation of a master batch mixture for polyvinyl chloride polymers, comprising heating to a temperature in the range of 80° C. to 150° C. in a mixer a first constituent mix comprising a mixture of

a polymer selected from the group consisting of polyvinyl chloride, a copolymer of vinyl chloride with polyvinylidene chloride and a mixture thereof,

at least one additional resin which is a shockproof, waterproof or barrier resin and is selected from the group consisting methyl acrylonnitrile-butadiene-styrene, methylacrylate-butadiene-styrene, acrylonitrile-butadiene-styrene and

polymerization additive, capable of being absorbed at temperatures in the range 80° C.–150° C. by said polymer, said additive being selected from at least one member of the group consisting of stabilizer and lubricant, the quantity of resin present in said first constituent mix being less than that of further resins introduced hereafter; transferring said heated first constituent mix, after a period of time sufficient for total absorption of said additive in said polymer of said first heated constituent mix into a second mixer already containing or then receiving a second, cooled or unheated constituent mix comprising an additional amount of said polymer and said additive maintained at a temperature at least 25° C. below said heated first constituent mix; mixing both constituent mixes to achieve rapid cooling by dissipiation of the heat content of said first constituent mix by said second constituent mix and cooling the resultant mixture to room temperature to provide a final master batch mixture.

4,116,909
PARTICLE AND METHOD FOR DISPERSING ADDITIVES IN THERMOPLASTIC RESIN

Bruce M. Muller, Homerville, Ohio, assignor to Customcolor, Inc., Cumberland, R.I.

Filed Jul. 28, 1976, Ser. No. 709,392

Int. Cl.² C08K *9/00*

U.S. Cl. 260—23.7 R **14 Claims**

1. An additive particle adapted to be added to a mass of thermoplastic base resin to impact property improvement to the mass, comprising a mixture of:

(a) an additive which includes pigment said pigment being from about 50 to 95 weight percent of said particle,

(b) from about 3 to about 25 weight percent of said particle of thermoplastic rubber which is a styrene-olefin-styrene block copolymer, and

(c) about 5 to about 20 parts by weight per 100 parts thermoplastic rubber of petroleum-based, alkylated aromatic hydrocarbon carrier resin having an average molecular weight of approximately 770 and a ring-and-ball softening point of approximately 100° C.

4,116,910
PRINTING INK BINDERS

Albert Rudolphy, Wiesbaden, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Germany

Filed Dec. 13, 1976, Ser. No. 750,134

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1975, 2556183

Int. Cl.² C08K *3/08, 3/10*

U.S. Cl. 260—25 **9 Claims**

1. A printing ink binder comprising a reaction product of

(I) a natural resin,

(IIa) a phenol-formaldehyde resol, or

(b) the components of IIa), or

(c) a combination of IIa) and IIb) and

(III) a compound of a metal of Group II of the Periodic Table according to Mendelejev,

which reaction product has a viscosity of from 40 to 600 cP (50% toluene/20° C), a content of phenol units of from 0.3 to 25% by weight based on the weight of component I, a total amount of at least two metals of from 3 to 12% by weight based on component I, at least 60% by weight of the metal of the salt groups of the reaction product being calcium and at least 5% by weight being at least one metal selected from the group consisting of magnesium and zinc, and the total amount of formaldehyde used is between 0.9 and 4 mol/mol phenol.

9. A printing ink composition comprising a binder as defined in claim 1 with a solvent selected from the group consisting of petrol alone and petrol in admixture with toluene.

4,116,911
REAR PROJECTION SCREENS

Junji Miyahara, and Hisatoyo Kato, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Dec. 29, 1975, Ser. No. 644,683

Claims priority, application Japan, Dec. 26, 1974, 49-446

Int. Cl.² G03B *21/56;* C08L *91/00*

U.S. Cl. 260—28.5 A **22 Claims**

1. A rear projection screen comprising a wax which is solid at room temperature and a wax reforming agent which is miscible with the wax and is present in an amount from about 0.1 to 80 weight % based on the total weight of the composition.

4,116,912
AQUEOUS RESIN DISPERSION AND THERMOSETTING PAINT COMPOSITION CONTAINING SAME

Ryuzo Mizuguchi, Tondabayashi; Atsushi Takahashi, Kyoto, and Shinichi Ishikura, Takatsuki, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

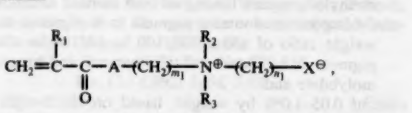
Filed Dec. 21, 1976, Ser. No. 753,086

Claims priority, application Japan, Dec. 26, 1975, 50-158407; Dec. 26, 1975, 50-158408; Dec. 29, 1975, 50-157651

Int. Cl.² C08L *61/28, 61/24*

U.S. Cl. 260—29.4 UA **6 Claims**

1. A thermosetting coating composition which comprises (A) an aqueous resin dispersion prepared by polymerization of (1) a polymerizable monomer having an ampho-ionic structure of the formula



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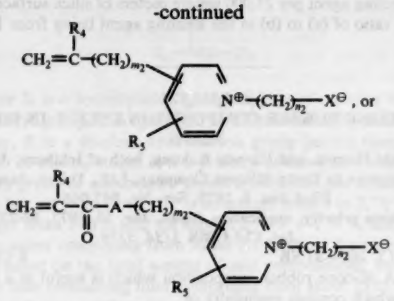


wherein R_1 is hydrogen or methyl, R_2 and R_3 are each C_1–C_6 alkyl, R_4 is hydrogen or methyl, R_5 is hydrogen or C_1–C_3 alkyl, A is —O— or —NH—, m_1 and n_1 are each an integer of 1 to 12, m_2 is an integer of 0 to 6, n_2 is an integer of 1 to 6 and $X^{\ominus}$ is $SO_3^{\ominus}$, $SO_4^{\ominus}$ or $COO^{\ominus}$, with (2) any other polymerizable monomer being copolymerizable therewith, in an aqueous medium, said polymerization being carried out by introducing the polymerizable monomer having an ampho-ionic structure and the other polymerizable monomer separately and simultaneously into the reaction system, and

(B) an aminoplast resin, the proportion of the resin component in the aqueous resin dispersion to the aminoplast resin being 100:5 to 100:100 by weight.

4,116,913

GELLING AGENT OF WATER MISCIBLE ORGANIC LIQUIDS

Eugene S. Barabas, Watchung, N.J., assignor to GAF Corporation, New York, N.Y.

Filed Apr. 26, 1977, Ser. No. 790,922
Int. Cl.[2] C08L *35/00*
U.S. Cl. 260—29.6 E **14 Claims**

1. A thickened composition consisting essentially of:

(a) a water-based emulsion copolymer of vinyl acetate monomer and a monoester of an unsaturated dicarboxylic acid monomer,

(b) water, and

(c) a water-miscible organic liquid.

4,116,914

ELASTOPLASTIC COMPOSITIONS OF ETHYLENE-VINYL ACETATE RUBBER AND POLYOLEFIN RESIN

Aubert Y. Coran, and Raman P. Patel, both of Akron, Ohio, assignors to Monsanto Company, St. Louis, Mo.

Filed Feb. 14, 1977, Ser. No. 768,329
Int. Cl.[2] C08L *23/08*
U.S. Cl. 260—30.6 R **14 Claims**

1. An elastoplastic composition comprising a blend of about 65 to about 15 parts by weight thermoplastic crystalline polyolefin resin and correspondingly about 35 to about 85 parts by weight cross-linked EVA rubber and rubber plasticizer in an amount of 0-50 weight percent of the EVA rubber wherein the EVA rubber is an amorphous copolymer of ethylene and 40 to 70 percent by weight vinyl acetate and is cross-linked to the extent that the toluene extractables as percent of rubber is 15 or less with the proviso that the combined weight of said resin, EVA rubber and optional rubber plasticizer is such that the amount of EVA rubber does not exceed 80 weight percent and the amount of polyolefin resin does not exceed 45 weight percent of the composition which composition is elastomeric and processable as a thermoplastic.

4,116,915

COMPOSITION FOR TREATING CONCRETE SURFACES

John A. Caramanian, 1021 Summer St., Cincinnati, Ohio 45204

Filed Mar. 29, 1977, Ser. No. 782,568
Int. Cl.[2] C08K *5/10*
U.S. Cl. 260—31.4 EP **7 Claims**

1. A composition for treating a concrete surface which consists essentially of 34 parts of an epoxy resin having an epoxide equivalent of a minimum of 175 to a maximum of 225, 13.6 parts of an organic polysulfide elastomer which is compatible with the epoxy resin, 8 parts of diethylene triamine, 52 parts ethylene glycol monoethyl ether acetate, 41 parts ethylene glycol monobutyl ether, and 51 parts of diluent in which a major portion is an aliphatic hydrocarbon solvent or diluents having a boiling point range from 150°–182° C., all parts being by weight, the composition having a viscosity of 9 to 24 seconds measured with a Number 4 Ford Cup.

4,116,916

FOUNDRY RESIN COMPONENTS

Melville J. Holik, Franklin Park, Ill., assignor to International Minerals & Chemical Corp., Libertyville, Ill.

Continuation-in-part of Ser. No. 733,722, Oct. 26, 1976, abandoned, which is a continuation-in-part of Ser. No. 631,549, Nov. 13, 1975, abandoned. This application Oct. 28, 1977, Ser. No. 846,250
Int. Cl.[2] C08K *5/06*
U.S. Cl. 260—33.2 R **27 Claims**

12. A resin component adapted for reaction with a polyisocyanate in the presence of a catalyst to provide a binder composition comprising in admixture

a. A phenol-formaldehyde resin characterized by:

(i) A phenol formaldehyde mole ratio in the range of 1.0:0.75 to 1.0:2.0,

(ii) A substituent $—(CH_2—O)_y—R$ group present at about 12 to 30% of the substituted phenolic nuclear positions,

(iii) Free phenol in the amount of about 5 to 15% by weight of the resin,

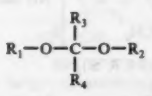
(iv) Water in the amount of less than 2% by weight of the resin,

(v) An average of about 2 ½ to 3 ½ phenolic nuclei per resin oligomer, and

(vi) A hydroxymethyl content of less than about 5 mole percent;

the bridges joining phenolic nuclei of said resin being predominantly ortho-para with at least about 20% of the bridges being para-para, said bridges being of the formula $—CH_2(OCH_2)_x—$ where x is zero in at least 30% of the bridges and x is an integer in the range of 1 to 6 in at least 20% of the bridges, y is an integer in the range of 1 to 6 and R is a hydrocarbon radical of 3 to 6 carbon atoms; and

b. A solvent in the amount of about 10% to 40% by weight of the resin solvent admixture, said solvent being of the formula



in which R_1 and R_2 are the same or different hydrocarbon radicals of 3 to 6 carbon atoms and R_3 and R_4 are the same or different hydrogen, methyl, ethyl or phenyl radicals.

4,116,917
HYDROGENATED STAR-SHAPED POLYMER

Rudolf J. A. Eckert, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

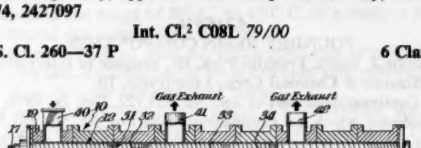
Filed Jan. 24, 1977, Ser. No. 762,211
Claims priority, application United Kingdom, Feb. 10, 1976, 5212/76
Int. Cl.[2] C08K 5/01
U.S. Cl. 260—33.6 AQ 27 Claims

1. A lubricating oil composition comprising a major proportion of a lubricating oil and between about 0.15 and 10.0% by weight of a hydrogenated star-shaped polymer wherein said polymer comprises a poly(poly-alkenyl coupling agent) nucleus and at least seven polymeric arms linked to said nucleus wherein said polymeric arms are selected from the group consisting of hydrogenated homopolymers of conjugated dienes and hydrogenated copolymers of two different conjugated dienes.

4,116,918
MELAMINE RESIN AND DYE MIXTURES

Hans Gattner, Frankfurt (Main), and Joachim Ribka, Offenbach (Main)-Burgel, both of Fed. Rep. of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Fed. Rep. of Germany

Filed Jun. 3, 1975, Ser. No. 583,174
Claims priority, application Fed. Rep. of Germany, Jun. 5, 1974, 2427097
Int. Cl.[2] C08L 79/00
U.S. Cl. 260—37 P 6 Claims



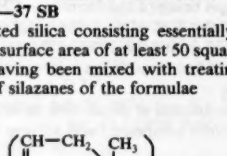
1. A process for the preparation of a light-fast melamine resin which process comprises kneading at a temperature from about 120° to about 160° C in a self-cleaning vented multiple-spiral kneader, a resinifying liquid etherified melamine-formaldehyde adduct in which the melamine has at least 3 oxymethyl groups per molecule and at least 2 of these groups are etherified with a C_1 or C_2 alkyl, completing the kneading before the liquid becomes solid, then completing the resinification at a temperature no higher than 200° C and in the absence of significant super-atmospheric pressure.

4,116,919
TREATMENT OF REINFORCING SILICA

Janet L. Elias; Chi-Long Lee, both of Midland, and Myron T. Maxson, Sanford, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Sep. 6, 1977, Ser. No. 830,527
Int. Cl.[2] C08L 83/04
U.S. Cl. 260—37 SB 11 Claims

1. A treated silica consisting essentially of finely divided silica with a surface area of at least 50 square meters per gram, said silica having been mixed with treating agent consisting essentially of silazanes of the formulae



(a)

$(RR'R''Si)_2NH$ (b)

where each R, R', and R'' is selected from a group consisting of lower alkyl, phenyl, and 2-(perfluoroalkyl) ethyl radicals in which the perfluoroalkyl radical is trifluoromethyl, perfluoroethyl, or perfluoroisobutyl, there being from 0.08 to 0.22 mole of treating agent per 25,000 square meters of silica surface, the mole ratio of (a) to (b) in the treating agent being from 1:5 to 1:40.

4,116,920
SILICONE RUBBER COMPOSITION USEFUL IN SHAFT SEALS

Hiroshi Honma, and Hiroshi Kakuno, both of Ichihara, Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan

Filed Jan. 5, 1978, Ser. No. 867,066
Claims priority, application Japan, Jan. 13, 1977, 52-2778
Int. Cl.[2] C08K 3/34, 3/36
U.S. Cl. 260—37 SB 4 Claims

1. A silicone rubber composition which is useful as a shaft seal which consists essentially of

(A) 100 parts by weight of a heat curable organopolysiloxane rubber,

(B) 5–100 parts by weight of a reinforcing silica filler;

(C) 5–100 parts by weight of diatomaceous earth;

(D) 2–100 parts by weight of an acicular platy mineral powder and,

(E) 0.1–10 parts by weight of an organic peroxide, wherein the weight of the components (B), (C), (D) and (E) are based upon 100 parts of (A) and there is present 30 to 150 parts by weight of components (B), (C) and (D) in the total composition (A) to (E).

4,116,921
NOVEL THERMOSETTING MOLDING COMPOSITION

Anthony Robert Olivo, Neshanic Station, N.J.; Anthony Constantine Soldatos, Geneva, Switzerland, and Sidney Joseph Schultz, Cranford, N.J., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 499,933, Aug. 23, 1974, abandoned, which is a continuation of Ser. No. 307,628, Nov. 17, 1972, abandoned. This application Jan. 5, 1977, Ser. No. 757,061
Int. Cl.[2] C08G 8/20
U.S. Cl. 260—38 4 Claims

1. A process for producing a one-step, heat convertible resinous reaction product of formaldehyde and 2,2-bis(4-hydroxyphenyl)propane, said reaction product having a viscosity of not more than about 30 centistokes measured at 25° C. as a 35 weight per cent solution in ethanol, and a polydispersity of from about 1.5 to about 5, and said product being suitable for use in molding compounds, wherein said process comprises the steps of:

(a) reacting formaldehyde with 2,2-bis(4-hydroxyphenyl)-propane in proportions of from about 2 to about 3.75 moles of formaldehyde per mole of 2,2-bis(4-hydroxyphenyl)propane, at an elevated temperature of at least about 70° C., in the presence of a catalytic quantity of an alkali metal or barium oxide or hydroxide condensation catalyst, for a period of time sufficient to produce a resinous reaction product having a predetermined degree of polydispersity;

(b) cooling and neutralizing said reaction product to a pH of from about 3 to about 8; and

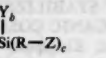
(c) recovering said reaction product.

4,116,922
REINFORCED POLYPIVALOLACTONE

Edwin D. Hornbaker; Jesse D. Jones; Michael E. Kucsma, and Thomas S. Allen, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Nov. 7, 1977, Ser. No. 849,337
Int. Cl.[2] C08K 3/40
U.S. Cl. 260—40 R 46 Claims

1. A thermoplastic composition comprising an intimate blend of polypivalolactone, a glass fiber reinforcing filler and a coupling agent having the formula



where X is a hydrolyzable group capable of reaction with a hydroxyl group, Y is hydrogen or a monovalent hydrocarbon group, R is a divalent hydrocarbon group having from 1 to about 20 carbon atoms, Z is a primary or secondary amino or epoxy group or a secondary amino monohydrogen halide, "*a*" is an integer from 1 to 3, "*b*" is an integer from 0 to 2, "*c*" is an integer from 1 to 3, and the sum of $a + b + c = 4$, said coupling agent comprising from about 0.1 to about 2 weight percent based on the total weight of said compositions, and said glass fiber reinforcing filler comprising from about 15 to about 60 weight percent based on the total weight of said compositions.

4,116,923

DYED POLYESTERS, PROCESS FOR THEIR PREPARATION AND THEIR USE FOR THE DYEING OF PLASTICS

Hans Gattner, Bad Nenndorf; Ernst Spietschka, Oberauroff, and Helmut Tröster, Königstein, Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 28, 1977, Ser. No. 782,163

Claims priority, application Fed. Rep. of Germany, Mar. 20, 1976, 2613493

Int. Cl.[2] **C08L** *67/00;* **C08G** *63/12*

U.S. Cl. 528—220 **15 Claims**

1. A polyester consisting essentially of recurring units of terephthalic acid, isophthalic acid or both of said acids and, per mol of said acid or acids, about 0.75 to 1.5 mol of a low-molecular weight trimethylol alkane, said polyester also containing 0.1 to 25% by weight of recurring units of the formula

$$-Y-F(-Z-)_n$$

in which F is identical or different dyestuff radicals, Y and Z, which are identical or different, are —O—CO— or —CO—O— and *n* is zero, 1 or 2.

4,116,924

PIGMENT CONCENTRATIONS

Alice Robertson Peabody, Glens Falls, N.Y., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 596,113, Jul. 15, 1975, which is a continuation-in-part of Ser. No. 575,284, May 7, 1975, abandoned. This application Oct. 29, 1976, Ser. No. 736,919

Int. Cl.[2] **C08K** *5/01*

U.S. Cl. 260—40 R **7 Claims**

1. A pelletizable pigment concentrate comprising an essentially agglomerate free intimate dispersion of by weight

(a) from 20 to 55% of pigment,

(b) from 5 to 35% of a friable dispersing resin having a softening point range of about 70° C. to about 195° C. and being selected from the group consisting of hydrocarbon resins having a molecular weight range of from about 350 to about 2000 and rosin esters, and

(c) from 30 to 65% of a polyester, at least 30% of which is at least one copolyester prepared from (1) ethylene glycol, (2) at least one aliphatic or cycloaliphatic diol containing 4 to 10 carbon atoms and (3) at least one difunctional dicarboxylic acid or its ester derivative, said copolyester having an intrinsic viscosity between about 0.45 and about 0.75 and a melting point range of about 140° to about 200° C.

4,116,925

POLY(TETRAMETHYLENE TEREPHTHALATE)-POLYETHER BLOCK

Armand E. Brachman, Allentown, Pa.; Ghazi Khattab, Parsippany, and Edwin M. Smolin, Kinnelon, both of N.J., assignors to GAF Corporation, New York, N.Y.

Filed Jun. 14, 1976, Ser. No. 695,377

Int. Cl.[2] **C08K** *7/14;* **C08L** *67/00, 67/06*

U.S. Cl. 260—42.18 **19 Claims**

1. A thermoplastic block copolymer having an elevated heat deflection temperature, said block copolymer comprising a block copolymer of poly(tetramethylene terephthalate) and a polyether selected from the group consisting of polyethylene oxide, poly(tetramethylene ether glycol) and mixtures thereof; wherein said polyether is present in an amount between about 1 percent to and about 7 percent by weight based on poly(tetramethylene terephthalate) and is randomly distributed therein.

4,116,926

STABILIZER FOR POLYMERS

James F. York, Morgantown, W. Va., assignor to Borg-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 603,848, Aug. 11, 1975, abandoned. This application Nov. 22, 1977, Ser. No. 853,923

Int. Cl.[2] **C08K** *5/52*

U.S. Cl. 260—45.7 P **15 Claims**

1. An improved acidic composition comprising in combination a dialkyl pentaerythritol diphosphite or a polyalkyl p,p'-isopropylidene diphenol polyphosphite wherein the alkyl groups each contain 8-20 carbon atoms, and a minor proportion of triisopropanolamine.

4,116,927

2,2,6,6-TETRAMETHYL-4-PIPERIDYL CARBOXYLIC ACID ESTERS OF BUTANE OR BUTENE TRI CARBOXYLIC ACIDS AS STABILIZERS FOR SYNTHETIC POLYMERS

Motonobu Minagawa, Kosigaya; Naohiro Kubota, and Toshihiro Shibata, both of Urawa, all of Japan, assignors to Argus Chemical Corporation, Brooklyn, N.Y.

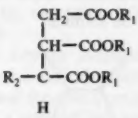
Filed Jul. 5, 1977, Ser. No. 812,968

Claims priority, application Japan, Jul. 12, 1976, 51-82024

Int. Cl.[2] **C07D** *211/44, 211/46;* **C08K** *5/34, 5/35*

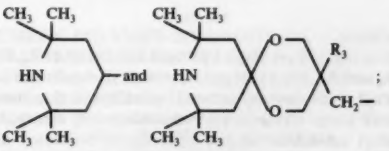
U.S. Cl. 260—45.8 NZ **18 Claims**

1. 2,2,6,6-tetramethyl-4-piperidyl carboxylic acid esters of butane or butene tricarboxylic acids, having the general formula:



wherein:

R_1 is selected from the group consisting of:



R_2 is selected from the group consisting of CH_3 and CH_2; and R_3 is lower alkyl having from one to about six carbon atoms.

15. An olefin polymer composition having improved resistance to deterioration comprising an olefin polymer selected from the group consisting of polymers of alpha-olefins having

from two to six carbon atoms and polystyrene, and a compound in accordance with claim 1.

4,116,928

HETEROCYLIC ESTER, ULTRAVIOLET STABILIZERS AND THEIR USE IN ORGANIC COMPOSITIONS

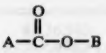
Gether Irick, Jr., and Charles A. Kelly, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 484,846, Jul. 1, 1974, abandoned. This application Dec. 17, 1976, Ser. No. 751,632

Int. Cl.[2] C08K 5/34, 5/35

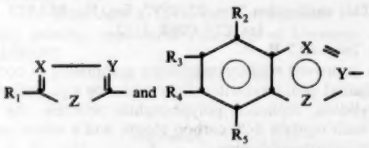
U.S. Cl. 260—45.8 NZ **39 Claims**

1. Compositions which comprise an organic material that is suceptible to ultraviolet degradation, and a stabilizing amount of a stabilizer selected from esters of heterocyclic acids having the formula:



wherein

A is a member of the group having the structures



wherein

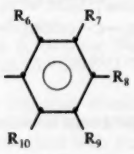
X is a carbon atom or a nitrogen atom in each formula;

Y is a carbon atom or a nitrogen atom in the first formula, but only a carbon atom in the second formula;

Z is an oxygen atom, a sulfur atom or a nitrogen atom containing a hydrogen atom or a substituted or unsubstituted lower alkyl group having 1 to 12 carbon atoms;

R_1, R_2, R_3, R_4 and R_5 are hydrogen, chloro, bromo, lower alkyl, substituted lower alkyl, cycloalkyl, substituted cycloalkyl, aryl, substituted aryl, lower alkylaryl, aryl-substituted-aryl, alkoxy, lower alkyl substituted amino, cyano, and the substituents R_2 and R_3, R_3 and R_4, and R_4 and R_5 combined with the carbon atoms to which they are attached are joined alkylene groups completing a carbocyclic ring, which ring can also be substituted with one or more of the substituents listed above for R_1, R_2, R_3, R_4 and R_5; and

B is a group having the formula



wherein

at least one of R_6 or R_{10} is hydrogen and the other R_6, R_7, R_8, R_9 and R_{10} are hydrogen, lower alkyl, substituted lower alkyl, cycloalkyl, substituted cycloalkyl, aryl, substituted aryl, lower alkylaryl, aryl-substituted-aryl, alkoxy, lower alkyl substituted amino, hydroxy, carboalkoxy, nitrile, chloro, bromo and substituents R_6 and R_7, R_7 and R_8, R_8 and R_9, R_9 and R_{10} combined with the carbon atoms to which they are attached are joined alkylene groups completing a carbocyclic ring which can be substituted with any of the substituents listed above for R_6, R_7, R_8, R_9 and R_{10}.

4,116,929

ULTRAVIOLET STABILIZERS AND THEIR USE IN ORGANIC COMPOSITIONS

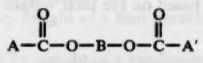
David Martin Pond, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 484,849, Jul. 1, 1974, Pat. No. 4,017,508. This application Jan. 12, 1977, Ser. No. 758,729

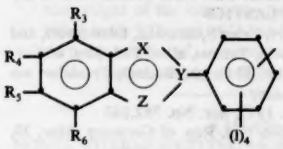
Int. Cl.[2] C08K 5/34, 5/35

U.S. Cl. 260—45.8 NT **72 Claims**

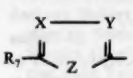
1. Compositions which comprise an organic material that is susceptible to ultraviolet degradation, and a stabilizing amount of a stabilizer selected from diesters of dihydroxybenzene compounds having the formula:



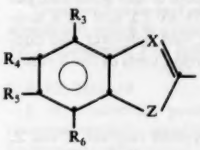
wherein A is a group having the structure



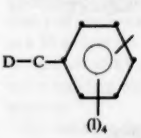
(1)



(2)



(3)



(4)

wherein

X and Y are a carbon atom or a nitroen atom;

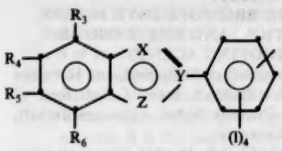
Z is an oxygen atom, a sulfur atom, a nitrogen atom (in formula (1) only), or a nitrogen atom containing a hydrogen atom or an alkyl group having 1 to 12 carbon atoms;

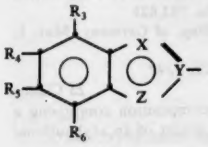
R_3, R_4, R_5, R_6 and R_7 are hydrogen, lower alkyl, substituted lower alkyl, cycloalkyl, substituted cycloalkyl, aryl, chlorine, bromine, substituted aryl, lower alkylaryl, aryl-substituted aryl, alkoxy, carboxy, nitrile, and the substituents R_3 and R_4, R_4 and R_5, and R_5 and R_6, combined with the carbon atoms to which they are attached are joined alkylene groups completing a carbocyclic ring which can be substituted with any of the substituents listed above for R_3, R_4, R_5, R_6 and R_7;

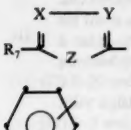
I is the same as R_3, R_4, R_5 and R_6 and is present on all positions of the benzenoid ring, except the carbon atom attached to the atom or the C group and the carbon atom attached to the carboxyl group connecting the A group with the aromatic B group;

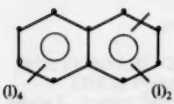
the group C is a moiety consisting of vinyl, lower alkyloxy, oxy-lower-alkyl and oxy;

the group D is a moiety having the structure









wherein

X is a carbon atom or a nitrogen atom in each formula;

Y is a carbon atom or a nitrogen atom in formula 3, but only a carbon atom in formulas 1 and 2;

Z is an oxygen atom, a sulfur atom, or a nitrogen atom containing a hydrogen atom or a substituted or unsubstituted lower alkyl group having 1 to 12 carbon atoms;

R_3, R_4, R_5 and R_6 are hydrogen, lower alkyl, substituted lower alkyl, cycloalkyl, substituted cycloalkyl, aryl, substituted aryl, lower alkylaryl, aryl-substituted-aryl, chloro, bromo, alkoxy, substituted amino, cyano, carboxy and the substituents R_3 and R_4, R_4 and R_5, and R_5 and R_6, combined with the carbon atoms to which they are attached, are joined alkylene groups completing a carbocyclic ring, which ring can also be substituted with one or more of the substituents listed above for R_3, R_4, R_5 and R_6.

I is a substituent listed above for R_3, R_4, R_5 and R_6 and is present on all positions of the benzenoid ring, except the carbon atom attached to the Y atom and the carbon atom attached to the C group. The carbonyl connecting group is attached to the benzenoid ring in either the meta or para position from the carbon atom connected to the C group. The I substituents can all be one of the substituents listed above or different listed substituents.

A' is a substituted or unsubstituted alkyl, aryl or the same as A.

B is an aryl group having the formula

wherein the carboxys are attached ortho, meta, or para, at least one of R_8, R_9, R_{10}, R_{11} is hydrogen in the ortho position to the carboxy linking group and the other substituents R_8–R_{11} are hydrogen, lower alkyl substituted lower alkyl, cycloalkyl, lower alkylaryl, aryl-substituted-aryl, alkoxy, carboxy, nitrile, chloro, bromo, and the substituents R_8–R_{11}, combined with the carbon atoms to which they are attached, are joined alkylidene groups completing a carbocyclic ring which can be substituted with any of the substituents listed above for R_8–R_{11}.

4,116,930

PYROMELLITIC DIMIIDES OF 3,5-DIALKYL-4-HYDROXYPHENYLSUBSTITUTED AMINES

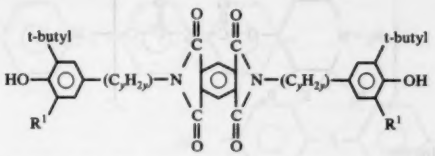
Martin Dexter, Briarcliff Manor; Martin Knell, Ossining; Peter Klemchuk, Yorktown Heights, and John F. Stephen, New City, all of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 628,259, Nov. 3, 1975, abandoned, which is a continuation-in-part of Ser. No. 450,540, Mar. 12, 1974, abandoned, which is a continuation of Ser. No. 186,499, Oct. 4, 1971, abandoned. This application Sep. 14, 1976, Ser. No. 723,128

Int. Cl.[2] C08K *5/34*

U.S. Cl. 260—45.8 N **9 Claims**

1. A compound of the formula



wherein R^1 is tert-butyl group, and *y* has a value from 0 to 3.

7. A composition of matter stabilized against oxidative deterioration which comprises a synethetic organic polymeric material normally subject to oxidative deterioration containing from 0.005 to 5% by weight of a stabilizing compound according to claim **1**.

8. A composition of claim 7 wherein the organic polymeric material is a polyolefin.

4,116,931

FLAME RETARDANT FIBERS, CARPETS AND MOLDING COMPOUNDS AND METHODS OF MAKING SAME

Pritam S. Minhas, Mendham, N.J., and Bernard Sukornick, Williamsville, N.Y., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Dec. 19, 1977, Ser. No. 861,779

Int. Cl.[2] C08K *5/09*

U.S. Cl. 260—45.75 B **55 Claims**

1. In a method of forming polyamide or polyester fibers which are formed from a melt, the improvement which comprises incorporating into the melt from about 0.5 to about 10% by weight of melt of a complex salt selected from the group consisting of antimony, aluminum and alkaline earth metal subgallates, borocitrates and borotartrates.

4,116,932

SYNTHETIC POLYMER COMPOSITIONS STABILIZED AGAINST DISCOLORATION AND DEGRADATION

Hans-Josef Buysch, Krefeld; Harald Oertel, Odenthal-Glebusch, and Ernst Roos, Odenthal-Osenau, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 20, 1976, Ser. No. 688,163

Claims priority, application Fed. Rep. of Germany, May 24, 1975, 2523107

Int. Cl.[2] C08K *5/13*

U.S. Cl. 260—45.95 R **3 Claims**

1. Polymer composition stabilised against degradation under the effect of light, heat and atmospheric influences, comprising

a polyurethane polymer and from 0.01 – 10% by weight, based on the quantity of said polymer, of a mixture of α,α'-bis-(2-hydroxy-3,5-dialkyl phenyl)-m-diisopropyl benzene and α,α'-bis-(2-hydroxy-3,5-dialkyl phenyl)-p-diisopropyl benzene, the mixture containing 40 – 70% by weight of the m-compound.

4,116,933

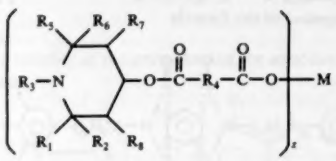
HINDERED PIPERIDINE CARBOXYLIC ACIDS, METAL SALTS THEREOF AND STABILIZED COMPOSITIONS

Chester E. Ramey, Spring Valley, and John J. Luzzi, Carmel, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 28, 1976, Ser. No. 700,380
Int. Cl.² C08K 5/17; C07D 211/46
U.S. Cl. 260—45.75 N **17 Claims**

1. A compound of the formula

I



wherein

R_1 and R_2 independently of each other are straight- or branched-chain alkyl having from 1 to 6 carbon atoms, or together with the carbon to which they are bound form a cyclopentyl or cyclohexyl ring, which is unsubstituted or substituted with a methyl group,

R_3 is hydrogen, alkyl having 1 to 12 carbon atoms β-methoxyethyl, alkenyl having 3 to 4 carbon atoms, propargyl, benzyl, alkyl substituted benzyl or acyl,

R_4 is straight- or branched-chain alkylene having 1 to 8 carbon atoms, or the group $—(CH_2)_mY(CH_2)_n—$ wherein Y is oxygen or sulfur and m and n independently of each other are an integer from 1 to 3,

M is metal selected from the group consisting of nickel, manganese, copper, zinc, cobalt, tin and dialkyl tin,

Z has a value of from 1 to 4, the value of Z being the same as the available valence of M, and

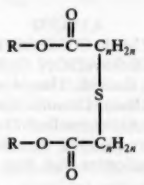
R_5 is alkyl of 2 to 6 carbon atoms, R_6 is alkyl of 1 to 6 carbon atoms, and R_7 and R_8 are independently hydrogen or alkyl of 1 to 5 carbon atoms, provided that R_7 and R_8 are not both hydrogen.

11. A composition of matter stabilized against ultraviolet deterioration which comprises a synthetic organic polymer normally subject to ultraviolet deterioration containing

(a) 0.005% to 5% of a stabilizing compound according to claim 1,

(b) 0 to 5% of a hindered phenolic antioxidant,

(c) 0 to 5% of a thio co-stabilizer



wherein R is an alkyl group having from 6 to 24 carbon atoms, and *n* is an integer from 1 to 6, and

(d) 0 to 5% of a U.V. absorber.

4,116,934

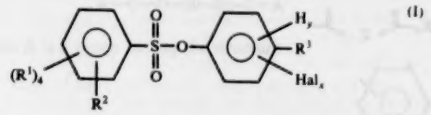
ARYLSULFONIC ACID BROMOPHENYL ESTERS, THEIR PREPARATION, AND THEIR USE AS FLAMEPROOFING AGENTS

Egon Norbert Petersen, Neunkirchen-Seelscheid, and Hermann Richtzenhain, Much-Schwellenbach, both of Fed. Rep. of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

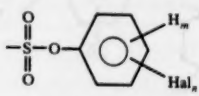
Continuation of Ser. No. 660,953, Feb. 24, 1976. This application May 2, 1977, Ser. No. 792,621
Claims priority, application Fed. Rep. of Germany, Mar. 1, 1975, 2508993
Int. Cl.² C08K 3/22, 5/42
U.S. Cl. 260—45.75 B **23 Claims**

1. A flame stabilized polyolefin composition comprising a polyolefin and a flame stabilizing amount of an aryl sulfonic acid ester of the formula

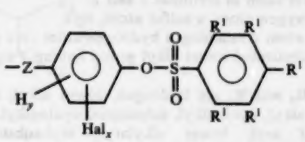
(I)



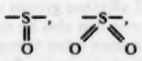
wherein R^1 represents hydrogen, alkyl groups of 1 to 8 carbon atoms, bromine or chlorine, R^2 represents R^1 or the group



Hal represents bromine or chlorine, *x* the numbers 2 to 4, *n* the numbers 3 to 5, *y* the numbers 4-*x*; *m* = 5-n, R^3 represents bromine, chlorine or the group



and Z represents —O—, —S—,



alkylene with 1 to 4 carbon atoms, or alkylidene, with the proviso that in the case of aryldisulfonic acid bis esters, the sulfonic ester groups are not in the ortho position.

4,116,935

ROOM-TEMPERATURE MOISTURE-CURING SILICONE ELASTOMER COMPOSITIONS AND A METHOD FOR THEIR PRODUCTION

Keiichi Kishimoto, and Masahiko Suzuki, both of Ichihara, Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan

Filed Jul. 22, 1977, Ser. No. 817,950
Claims priority, application Japan, Aug. 20, 1976, 51/98738
Int. Cl.² C08G 77/04
U.S. Cl. 528—34 **4 Claims**

1. A room-temperature curing silicone elastomer composition consisting of

(A) a hydroxylated organopolysiloxane of the general formula

$HO(RR'SiO)_nH$

wherein R and R′ are the same or different monovalent hydrocarbon groups,

n is at least 5;

(B) 0.5–15 weight percent, based on the weight of (A), of a crosslinking material which is a mixture of

(i) acetoxysilanes having the general formula $RSi(OAc)_3$ wherein R is the same as above and OAc is the radical

and

(ii) acetoxysiloxanes having the general formula $R(AcO)_2SiOSi(OAc)_2R$ wherein R and OAc have the meanings set forth above, wherein the ratio of (i) to (ii) is used in a range of 80–20 weight percent of (i) to 20–80 weight percent of (ii);

(C) 0–20 weight percent, based on the weight of (A), of a filler and,

(D) 0–5 weight percent based on the weight of (A), of an organometallic compound.

4,116,936

POLYVINYLBENZYL ETHERS OF POLYPHENOLS, THEIR POLYMERS AND COPOLYMERS

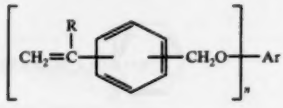
Edwin C. Steiner, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 598,528, Jul. 23, 1975, abandoned. This application Sep. 7, 1976, Ser. No. 720,923

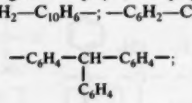
Int. Cl.[2] C08F *36/00, 12/34, 28/04*

U.S. Cl. 526—286 **8 Claims**

1. A thermoset polymeric product obtained by the addition polymerization of an unsaturated monomer having the formula:



wherein Ar is a radical of an aromatic nucleus selected from the group consisting of $-C_6H_4-$; $-C_6H_4-C_6H_4-$; $-C_{10}H_6-$; $-C_{10}H_6-CH_2-C_{10}H_6-$; $-C_6H_2-CH_2-C_6H_4-$; and



where R is hydrogen or methyl and *n* is 2 or 3.

4,116,937

COMPLIANT MALEIMIDE BASED PLASTICS

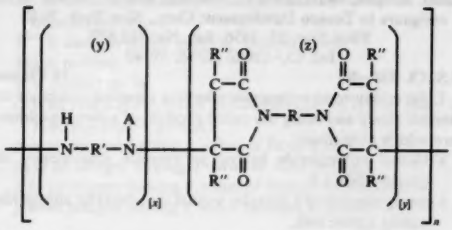
Robert J. Jones, Hermosa Beach; Michael K. O'Rell, Manhattan Beach, and James D. Sutherland, Los Angeles, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Aug. 25, 1976, Ser. No. 717,785

Int. Cl.[2] C08G *69/44, 73/12*

U.S. Cl. 528—170 **7 Claims**

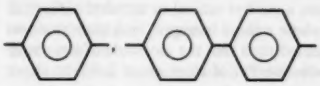
1. A melt produced, solid branched polyimide precursor having random recurring units of the following structure:



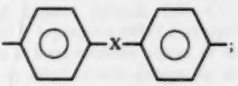
wherein R is a difunctional radical consisting essentially of

(i) aliphatic ethers having 1 to 6 carbon atoms in repeating units sufficient to provide a molecular weight of 300 to 10,000 and

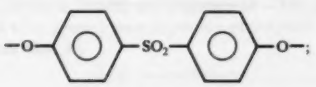
(ii) aromatic radicals selected from the group consisting of:



and

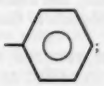


with the component X of said aromatic radical being selected from the group consisting of —O—, —S—, $-SO_2-$, $-CH_2-$, $-C_2H_4$, —CO, $-C_3H_6-$, and

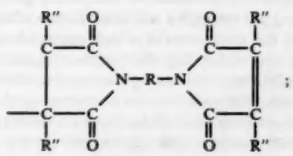


and with the amount of such aliphatic ether ranging from 30 to 60 percent by weight of R present and such aromatic radicals comprising the balance; wherein R′ is a difunctional radical consisting essentially of one or more of the aromatic radicals in (ii) above;

R″ is selected from the group consisting of —H, —Cl, $-CH_3$, $-C_2H_5$, $-C_3H_7$, $-C_4H_9$, and



A is selected from the group consisting of hydrogen and



wherein the weight ratio of the *y* moiety to the *z* moiety of said precursor ranges from about 1 to 4 to about 1 to 6.5, and wherein *n* is an integer ranging from 2 to 150.

4,116,938
POLYETHER DIUREIDE EPOXY ADDITIVES

Heinz Schulze, and Harold G. Waddill, both of Austin, Tex., assignors to Texaco Development Corp., New York, N.Y.

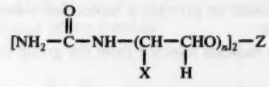
Filed Nov. 22, 1976, Ser. No. 743,877
Int. Cl.[2] C08G *59/48, 59/42*
U.S. Cl. 528—93 14 Claims

1. An epoxy resin composition having superior resistance to thermal shock and being the cured product of a curable admixture which comprises:

a vicinal polyepoxide having an epoxide equivalency of greater than 1.8;

a curing amount of a bicyclic vicinal dicarboxylic anhydride curing agent; and,

an effective amount of an additive consisting essentially of a polyether diureide of the formula



wherein X is hydrogen, a methyl radical or an ethyl radical; Z is a hydrocarbon alkylene radical having 2 to 5 carbon atoms and *n* is a number selected such that the molecule of the above formula has a molecular weight of from about 2,000 to about 3,000.

4,116,939
INTRINSIC VISCOSITY CONTROL OF POLYPHENYLENE ETHER REACTION MIXTURES

Glenn Dale Cooper, Delmar, and Daniel Edwin Floryan, Glenmont, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 20, 1976, Ser. No. 752,023
Int. Cl.[2] C08G *65/44*
U.S. Cl. 528—215 25 Claims

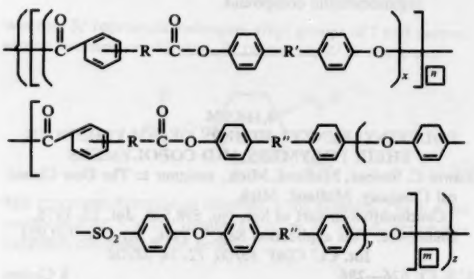
1. In a process for forming a polyphenylene ether by an oxidative coupling reaction in the presence of a chelatable metal ion-amine complex catalyst comprising passing an oxygen-containing gas through a reaction solution of a phenol and said catalyst, the improvement which comprises terminating the reaction and stabilizing the polymer against molecular weight degradation by contacting the reaction solution with (i) a chelating agent for such ion, the chelating agent being present in an amount from 0.1 mole to about 100 moles per mole of metal ion in the reaction solution, in combination with (ii) an aromatic amine, the aromatic amine being present in an amount of from about 1 to about 20 pounds per thousand pounds of polyphenylene ether, and recovering the polyphenylene ether from the reaction solution.

4,116,940
POLY/ARYLATE-SULPHONES/AND METHOD OF PREPARING SAME

Vasily Vladimirovich Korshak, ulitsa Gubkina, 4, kv. 81; Svetlana Vasilievna Vinogradova, ulitsa Miklukho-Maklaya, 30, korpus 2, kv. 63; Ivan Pavlovich Storozhuk, 1 Baltiisky pereulok, 6/21, korpus 7, kv. 24; Petr Maximilianovich Valetsky, Leningradskoe shosse, 48, kv. 132, all of Moscow; Lev Borisovich Sokolov, ulitsa Truda, 18, kv. 35, Vladimir; Abdulakh Kazbulatovich Mikitaev, ulitsa Profsojuznaya, 214, kv. 6, Nalchik; Andrei Alexandrovich Askadsky, ulitsa Profsojuznaya, 102, korpus 6, kv. 25, Moscow; Jury Sergeevich Kochergin, ulitsa D.Ulyanova, 5, kv. 10, Moscow; Grigory Lvovich Slonimsky, ulitsa Chkalova, 1, kv. 16, Moscow; Larisa Borisovna Shirokova, ulitsa Sovetskoi Armii, 3, kv. 45, Moscow; Ljudmila Fedorovna Nebosenko, ulitsa Tokareva, 8, kv. 26, and Nikolai Danilovich Zhuravlev, ulitsa Belokonskoi, 15b, kv. 44, both of Vladimir, all of U.S.S.R.

Filed Nov. 2, 1976, Ser. No. 737,994
Claims priority, application U.S.S.R., Nov. 17, 1975, 2187066
Int. Cl.[2] C08G *63/18, 63/66, 63/68*
U.S. Cl. 528—173 12 Claims

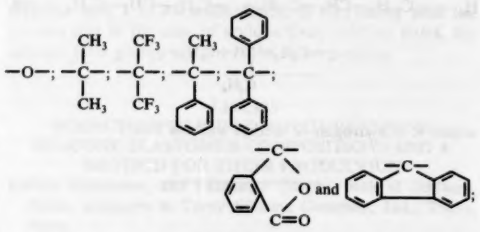
1. Poly(arylate-sulphones) having the formula:



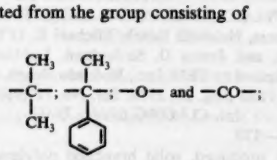
wherein

R is selected from the group consisting of a carbon-carbon bond in para- or meta- position; and

R′ is selected from the group consisting of



R″ is selected from the group consisting of



n and *m* are indices denoting statistical distribution of structures over the macrochain;
n and *m* are statistical values ranging from 1 to 10;
x is a statistical value ranging from 1 to 100;
y = 3 to 20;
x = 5 to 20.

4,116,941

WATER-SOLUBLE POLYESTER-IMIDES

Robert B. Hanson, Aurora, Ill., assignor to Standard Oil Company, a corporation of Indiana, Chicago, Ill.

Filed Jun. 1, 1976, Ser. No. 691,771
Int. Cl.[2] C08G *63/12*
U.S. Cl. 260—29.2 N **11 Claims**

1. A water-soluble polyesterimide resin comprising the reaction product of
1. a mixture of glycol and triol,
2. a mixture of organic diacid and trimellitic anhydride, and
3. aromatic primary diamine wherein the ratio of trimellitic anhydride to (3) is about 2:1 and wherein the equivalent ratio of (1) to (3) is about 1.7:1 to about 8:1

which is subsequently reacted with additional trimellitic anhydride.

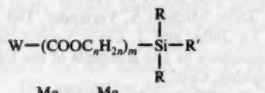
4,116,942

PROCESS FOR CATALYTIC PRODUCTION OF POLYESTERS

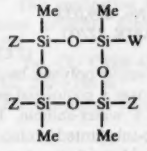
Kurt Weinberg, Upper Saddle River, N.J., and Gordon Carlton Johnson, Armonk, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Feb. 28, 1977, Ser. No. 772,759
Int. Cl.[2] C08G *63/12*
U.S. Cl. 528—283 **12 Claims**

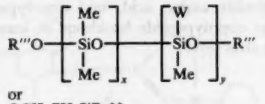
1. In a process for the manufacture of solid fiber-forming polyesters or copolyesters of dicarboxylic acid compounds and aliphatic glycols in the presence of catalysts, the improvement which comprises using as polyesterification catalyst a mixture comprising:
(A) antimony diglycollate and
(B) a silicon compound selected from the group consisting of:



(I)

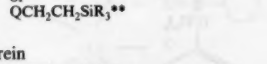


(II)



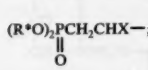
(III)

or



(IV)

wherein
W is $CH_2{=}CX-$ or



X is hydrogen or methyl and is methyl only when *m* is one;
R* is alkyl or haloalkyl having from 1 to 4 carbon atoms;
R** is methyl, ethyl, butyl, methoxy, ethoxy or butoxy;
R is methyl, ethyl, butyl, methoxy, ethoxy, butoxy or trimethylsiloxy;
R' is methyl, methoxy, ethoxy, butoxy or trimethylsiloxy;
R'' is methoxy, ethoxy, butoxy, trimethylsiloxy or vinyldimethylsiloxy;
R''' is methyl, ethyl, butyl or trimethylsilyl;
Me is methyl;
Z is methyl or W;
Q is an NH_2CH_2-, $NH_2CH_2CH_2NHCH_2-$, NC—, HS— or $HSCH_2CH_2S-$ group;
n is an integer having a value of from 2 to 5;
m is an integer having a value of zero or one;
x is an integer having a value of from 1 to 100; and
y is an integer having a value of from 1 to 100.

4,116,943

POLYESTER-AMIDES

Michel Ducarre, Sainte-Foy-Les-Lyon, France, assignor to Rhone-Poulenc-Textile, Paris, France

Filed Mar. 15, 1977, Ser. No. 777,576
Claims priority, application France, Mar. 22, 1976, 76 08420
Int. Cl.[2] C08G *63/68*
U.S. Cl. 528—292 **4 Claims**

1. A moldable polyester-amide characterised in that it is derived from:
an aromatic organic diacid (1) whose carboxyl groups are directly attached to an aromatic ring in the para-position;
a primary diol (2) of the general formula $HO—CH_2—R—CH_2—OH$ in which R represents either a straight aliphatic chain comprising at least 4 carbon atoms, or an aliphatic chain branched by alkyl or aryl groups, or an aromatic ring; and
a salt of an organic diacid (3) and a primary diamine of aliphatic character (4);
and being further characterised in that it possesses a degree of whiteness equal to or greater than 80% and a luminosity equal to at least 35%, as defined in standard specification ASTM-E 308-66, and a number of $—NH_2$ end groups equal to or greater than 30 per ton of polymer, preferably greater than 40.

4,116,944

POLYESTER PROCESS

James C. Hill, Chesterfield, and Walter R. Knox, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 646,306, Jan. 2, 1976, abandoned. This application Feb. 2, 1978, Ser. No. 874,309
Int. Cl.[2] C08G *63/00*; C08F *18/14*
U.S. Cl. 528—366 **17 Claims**

1. A process for the production of a polyester having an acid number which is not greater than 65 which comprises:
a. forming a mixture of a diacid anhydride with a monoterminal epoxide in an anhydride to epoxide molar ratio of from 1:1 to 1:1.5 in the presence of a solvent for the polyester and from 0.2 to 0.0001 mole per mole of anhydride of a catalytically effective quaternary salt and, optionally, in the presence of up to 0.2 mole per mole of anhydride of water,
b. initiating a non-self-sustaining exothermic reaction between the epoxide and the anhydride,
c. raising the temperature of the mixture to a point at which the exothermic reaction becomes self-sustaining, and
d. controlling the reaction conditions such that the temperature of the reaction mixture is not reduced until the maximum peak temperature has been reached in the reaction mixture and substantially all available monomer has been consumed;
the time spent in stages *b* and *c* combined being less than 200 sec. and the time taken in stage *d* from the initiation of the self-sustaining exothermic reaction to the attainment of the peak temperature being also less than 200 seconds.

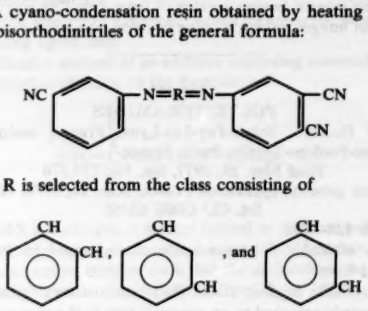
4,116,945
ELECTRICAL CONDUCTING PHTHALONITRILE POLYMERS

James R. Griffith, Riverdale Heights, and Jacques G. O'Rear, Temple Hills, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 681,087, Apr. 28, 1976, Pat. No. 4,057,569.
This application Oct. 20, 1977, Ser. No. 843,906
Int. Cl.[2] C08G *73/00, 12/08*
U.S. Cl. 528—362 10 Claims

1. A cyano-condensation resin obtained by heating one or more bisorthodinitriles of the general formula:

where R is selected from the class consisting of



to a temperature above the melting point thereof.

4,116,946
HARDENABLE MIXTURES CONTAINING POLYFUNCTIONAL AROMATIC CYANIC ACID ESTERS

Hans-Dieter Jakob, Leverkusen; Rolf Kubens, Odenthal, and Heinrich Heine, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Jun. 20, 1977, Ser. No. 808,023
Claims priority, application Fed. Rep. of Germany, Jun. 24, 1976, 2528417
Int. Cl.[2] C08F *28/00;* C08G *75/00*
U.S. Cl. 528—172 8 Claims

1. A hardenable mixture comprising:
A. 40 to 90% by weight of at least one polyfunctional aromatic cyanic acid ester;
B. 10 to 60% by weight of at least one polymerisable olefinically unsaturated monomer selected from the group consisting of diisobutylene, styrene, styrene nuclearly substituted with alkyl having 1 to 4 carbon atoms in the alkyl group, α-methyl styrene, vinyl chloride, vinyl acetate, acrylic and methacrylic acid esters with 1 to 8 carbon atoms in the alcohol component, acrylonitrile and diallyl phthalate and, optionally
C. 0.01 to 10% by weight, based on the sum of (A) and (B) of at least one hardening catalyst.

4,116,947
BRANCHED ARYLENE SULFIDE POLYMER PRODUCTION

James T. Edmonds, Jr., and Lacey E. Scoggins, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 29, 1977, Ser. No. 792,172
Int. Cl.[2] C08G *75/16*
U.S. Cl. 528—388 16 Claims

1. A process for the production of branched arylene sulfide polymers having a melt flow sufficiently low that the resulting polymers can be fabricated without prior curing into shaped products having desirable properties, which process comprises contacting:
(1) at least one p-dihalobenzene;
(2) at least one polyhalo aromatic compound having more than two halogen substituents per molecule;
(3) at least one alkali metal sulfide;
(4) at least one N-alkyl lactam; and
(5) one member selected from the group consisting of:
(a) water in an amount of about 1.2 moles to about 2.4 moles per mole of alkali metal sulfide, and
(b) at least one sodium carboxylate and water in an amount of about 1.0 mole to about 2.4 moles per mole of alkali metal sulfide;

under polymerization conditions of temperature and for a period of time sufficient to form a branched arylene sulfide polymer having a low melt flow of about 1 to about 700.

4,116,948
PROCESS FOR REMOVAL OF INORGANICSALTS FROM PEPTIDE/SALT-CONTAINING SUBSTANCES

Hellmut Mittenzwei, Pixistrasse 10, 8000 Munich, Germany, and Janez Terpin, Hohenbrunn, Germany, assignors to Hellmut Mittenzwei, Germany

Continuation of Ser. No. 667,456, Mar. 16, 1976, abandoned.
This application Oct. 3, 1977, Ser. No. 838,486
Claims priority, application Fed. Rep. of Germany, Mar. 24, 1975, 2512936
Int. Cl.[2] C07G *7/00*
U.S. Cl. 260—112 R 7 Claims

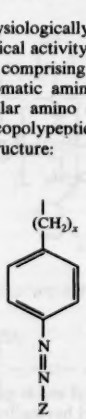
1. A process for removing inorganic salts from a liquid medium having a solids content of from about 25 to about 65 mg/ml and which contains active organic peptide substances of a molecular weight of from about 500 to about 10,000 and a high amount up to 70% by weight of inorganic salts based on the solids content of the liquid medium, which comprises the steps of transferring said liquid medium onto a filtration gel layer carried on a perforated centrifuge drum at a liquid medium: gel volume ratio of from about 1:2.5 to about 1:4.5, said filtration gel layer being highly cross-linked and having a particle size of from about 40 to about 120μ, centrifuging at a maximum centrifugal force of from about 800 to about 1500 g, and collecting the liquid centrifugate which contains the active organic peptide substances and an amount of salt reduced by 32.2 to 80% of said high amount.

4,116,949
WATER-SOLUBLE, PHYSIOLOGICALLY ACTIVE, SYNTHETIC COPOLYPEPTIDES

Murray Goodman, La Jolla; Michael S. Verlander, Del Mar; Nathan O. Kaplan, La Jolla, and J. Craig Venter, Solana Beach, all of Calif., assignors to The Reagents of the University of California, Berkley, Calif.

Filed Apr. 21, 1976, Ser. No. 679,032
Int. Cl.[2] C07C *103/52;* A61K *37/00*
U.S. Cl. 260—112.5 R 12 Claims

1. A water-soluble, physiologically active polymer having a high degree of physiological activity over a prolonged period of time, said polymer comprising a water-soluble, linear copolypeptide of an aromatic amine-substituted amino acid and at least one dissimilar amino acid, said copolypeptide having attached to the copolypeptide backbone at least one substituent having the structure:



wherein Z is selected from the group consisting of a catecholamine, morphine, an antibiotic, steroid, reserpine, α-methyl dihydroxyphenylalanine, L-dihydroxyphenylalanine, seroti-

nin, carbutamide, tyrosine-containing peptide hormone, gastrin, and substituted phenethylamine group, and *x* is an integer equal to 0 or 1.

4,116,950

ANALOGS OF HUMAN β-ENDORPHIN

Choh Hao Li, Berkeley, Calif., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Jan. 16, 1978, Ser. No. 869,555

Int. Cl.[2] C07C *103/52;* A61K *37/00*

U.S. Cl. 260—112.5 R **5 Claims**

1. Analogs of β-human endorphin of the formula

[X, Phe^{27}, Gly^{31}] - β_h-endorphin

wherein X is selected from null, $Ala^{6,7}$, Nle^5 and D-Thr^2 and the pharmaceutically acceptable acid addition salts thereof.

4,116,951

[ASN^2]-THYMOSIN α_1 AND ANALOGS THEREOF

Su-sun Wang, Bloomfield, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 789,898, Apr. 22, 1977, abandoned. This application Jan. 23, 1978, Ser. No. 871,563

Int. Cl.[2] C07C *103/52;* A61K *37/00*

U.S. Cl. 260—112.5 R **3 Claims**

1. [Asn^2]-thymosin α_1 and pharmaceutically acceptable salts thereof.

4,116,952

UNSYMMETRICAL AZO - AZO METHINE 1:2 CHROMIUM COMPLEX DYES

Fabio Beffa, Riehen, Switzerland; Gerhard Back, Lörrach, Germany, and Eginhard Steiner, Füllinsdorf, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.J.

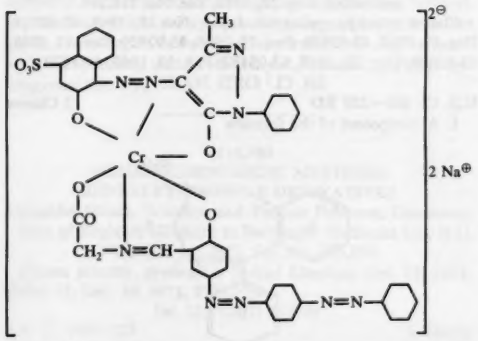
Division of Ser. No. 680,640, Apr. 27, 1976, Pat. No. 4,033,942. This application Apr. 18, 1977, Ser. No. 788,217

Claims priority, application Switzerland, May 14, 1975, 6193/75

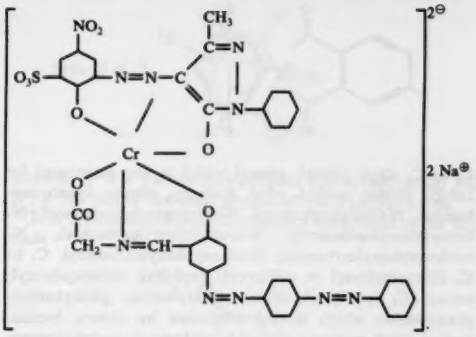
Int. Cl.[2] C09B *45/06, 45/26;* D06P *1/10, 3/32*

U.S. Cl. 260—145 B **2 Claims**

1. The chromium comples dye of the formula



2. The chromium complex dye of the formula



4,116,953

AZO DYES

Peter Dimroth, Mannheim; Helmut Junge, Wachenheim; Peter Tonne, Neustadt, and Rolf Urtel, Frankenthal, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

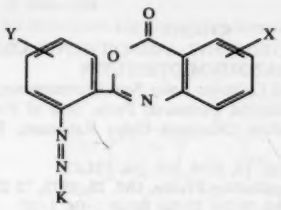
Filed Sep. 16, 1976, Ser. No. 723,916

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1975, 2544568

Int. Cl.[2] C09B *29/20, 29/22, 29/32, 29/36*

U.S. Cl. 260—157 **4 Claims**

1. A compound of the formula

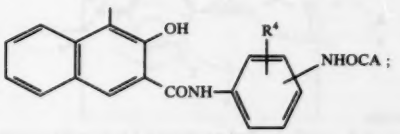


in which:

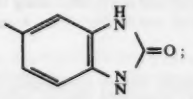
x is hydrogen, chloro, bromo, methyl or nitro;

Y is hydrogen, chloro, bromo or methyl;

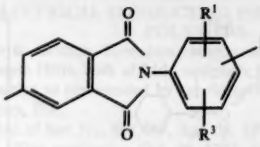
K is CH_3 COCHCONHZ or



Z is phenyl substituted by chloro, bromo, methyl, ethyl, methoxy, ethoxy, acetylamino, propionylamino, benzoylamino, chlorobenzoylamino or dichlorobenzoylamino; or



A is



; C_1 to C_4 alkyl;

C_1 to C_4 alkyl; phenyl; phenyl which is ring-substituted by chloro, bromo, methyl, ethyl, methoxy, ethoxy, cyano, carbamoyl, N-phenylcarbamoyl, N-chlorophenylcarbamoyl, N-bromophenylcarbamoyl, N-methylphenylcarbamoyl, N-methoxyphenylcarbamoyl, N-ethoxyphenylcarbamoyl, C_1 to C_4 alkoxycarbonyl or sulfamoyl; naphthyl; anthraquinonyl; amino; C_1 to C_5 alkylamino; benzylamino; phenylamino; phenylamino which is ring-substituted by chloro, bromo, methyl, ethyl, methoxy, ethoxy or carbamoyl; naphthylamino; anthraquinonylamino; phenoxy; or phenoxy substituted by chloro, bromo, methyl, ethyl, methoxy or ethoxy;

R^1 is hydrogen, chloro, bromo, C_1 to C_4 alkyl, C_1 to C_4 alkoxy, phenyl, methylsulfonyl, ethylsulfonyl, carbamoyl or sulfamoyl;

R^2 is hydrogen, chloro, bromo, methyl, ethyl, methoxy or ethoxy;

R^3 is hydrogen, chloro, bromo, methyl or ethyl; and

R^4 is hydrogen, chloro, bromo, methyl, ethyl, methoxy or ethoxy.

4,116,954

5-[4-(N-TRIFLUOROETHYL-AMINO)PHENYLAZO]-PYRAZOLIUM DYESTUFFS

Gerard Emile Edgard Coispeau, Soisy Sous Montmorency, and Jacques Pierre Edmond Pechmeze, Paris, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

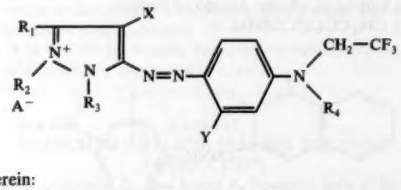
Filed Aug. 12, 1976, Ser. No. 714,079

Claims priority, application France, Oct. 28, 1975, 75 32860

Int. Cl.[2] C09B *29/00, 29/08;* **D06P** *1/04, 1/10*

U.S. Cl. 260—162 **1 Claim**

1. A dyestuff represented by the formula



wherein:

one of R_1 and R_3 is alkyl containing 1 to 4 carbon atoms and the other is phenyl, chlorophenyl or methoxyphenyl;

R_2 is alkyl containing 1 to 4 carbon atoms;

R_4 is hydrogen, alkyl containing 1 to 4 carbon atoms, or alkyl containing 1 to 4 carbon atoms and substituted by hydroxy, chlorine, alkoxy containing 1 to 4 carbon atoms or acylamino, the acyl residue of said acylamino being that of an aliphatic carboxylic acid containing 1 to 4 carbon atoms or benzoyl;

X is hydrogen or chlorine;

Y is hydrogen, chlorine, methyl, alkoxy containing 1 to 4 carbon atoms or acetylamino; and

A^- is a monovalent anion.

4,116,955

INCLUSION COMPLEX COMPOUND, PROCESS FOR ITS PRODUCTION, AND METHOD FOR ITS USE

Yataro Ichikawa; Mamoru Yamamoto; Hideki Tsuruta; Kenichi Kato, all of Iwakuni; Teizo Yamaji, Hachioji; Eishin Yoshisato, and Toshiyuki Hiramatsu, both of Hino, all of Japan, assignors to Teijin Limited, Osaka, Japan

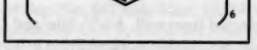
Filed May 31, 1977, Ser. No. 802,022

Claims priority, application Japan, Jun. 18, 1976, 51/66044

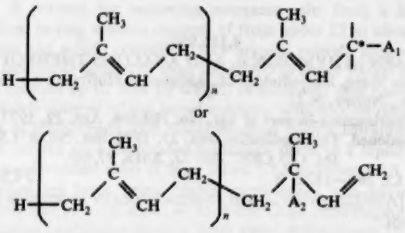
Int. Cl.[2] C07C *107/00;* **C09B** *27/00;* **C11C** *1/00;* **C09F** *5/00*

U.S. Cl. 260—192 **11 Claims**

1. An inclusion complex compound comprising (a) meta-cyclophane of the formula



and (b) a trans-terpenoid of the formula



wherein n is an integer of 1 to 9; A_1 and A_2 each represent (1) a hydrogen atom, (2) a halogen atom, (3) an inorganic group containing an oxygen, nitrogen or sulfur atom, (4) an organic group containing 1 to 5 carbon atoms, or (5) an organic group containing an oxygen, nitrogen or sulfur atom and 1 to 5 carbon atoms; and C* is the carbon atom of a carbonyl or methylene group,

included by the meta-cyclophane.

4,116,956

BENZODIAZEPINE DERIVATIVES

Kanji Meguro, and Yutaka Kuwada, both of Hyogo, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

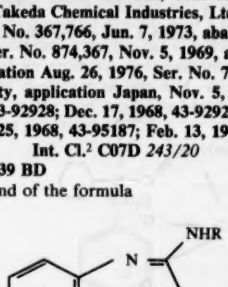
Division of Ser. No. 367,766, Jun. 7, 1973, abandoned, which is a division of Ser. No. 874,367, Nov. 5, 1969, abandoned. This application Aug. 26, 1976, Ser. No. 718,194

Claims priority, application Japan, Nov. 5, 1968, 43-80813; Dec. 17, 1968, 43-92928; Dec. 17, 1968, 43-92929; Dec. 17, 1968, 43-92930; Dec. 25, 1968, 43-95187; Feb. 13, 1969, 44-10702

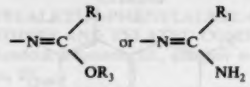
Int. Cl.[2] C07D *243/20*

U.S. Cl. 260—239 BD **2 Claims**

1. A compound of the formula



wherein R is



in which R_1 is hydrogen, alkyl of 1-6 carbon atoms, benzyl, phenethyl or phenyl and R_3 is methyl or ethyl, the rings A and B, independently of each other, are each unsubstituted or substituted by one member selected from the group consisting of nitro, halogen, trifluoromethyl, methyl, ethyl, propyl, methoxy and ethoxy, R_2 is hydrogen, methyl, ethyl, propyl, isopropyl, butyl, sec-butyl, tert-butyl, amyl or hexyl, and the nitrogen atom at the 4-position is optionally in the form of an N-oxide.

4,116,957

RIFAMYCIN COMPOUNDS

Vittorio Rossetti; Leonardo Marsili, and Carmine Pasqualucci, all of Milan, Italy, assignors to Archifar Industrie Chimiche del Trentino S.p.A., Rovereto, Italy

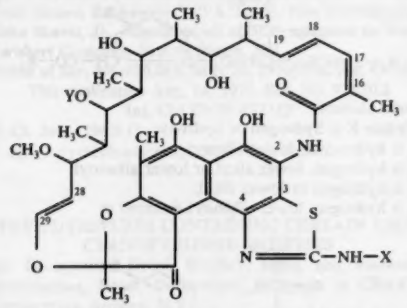
Filed Sep. 7, 1977, Ser. No. 831,224

Claims priority, application Italy, Oct. 18, 1976, 2962 A/76

Int. Cl.[2] C07D *51/18*

U.S. Cl. 260—239.3 P **2 Claims**

1. A rifamycin compound having the formula:



and its 16, 17, 18, 19 tetrahydroderivatives and 16, 17, 18, 19, 28, 29 hexahydroderivatives, wherein Y is —H or —$COCH_3$, and X is selected from the group consisting of hydrogen; C_1–C_{12} alkyl; C_3–C_4 alkoxyalkyl; C_2–C_4 hydroxyalkyl; C_4–C_6 N,N-dialkylaminoalkyl; C_7–C_8 arylalkyl hydrocarbon; C_3–C_7 cycloalkyl; C_3–C_6 alkenyl; phenyl; C_7 arylalkyl hydrocarbon substituted in the aromatic ring with a radical selected from the group consisting of halogen, methyl, ethyl, propyl, butyl, methoxyl, N,N-dimethylamino; phenylmethylimino; furfuryl-2-methylimino; and a heterocyclic group selected from the group consisting of furfuryl, tetrahydrofurfuryl, 1,2,4-triazol-3-yl, thienylmethyl and 1,3-dimethyl-2,6-dioxo-1,2,3,6-tetrahydropyrimidine-4-yl.

4,116,958

ORGANIC SYNTHETIC METHODS BENZYLPYRIMIDINE DERIVATIVES

Alexander Stuart, Bromley, and Thomas Paterson, Gravesend, both of England, assignors to Burroughs Wellcome Co., N.C.

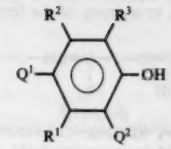
Filed Oct. 10, 1972, Ser. No. 295,890

Claims priority, application United Kingdom, Oct. 12, 1971, 47492/71; Dec. 10, 1971, 57512/71

Int. Cl.[2] C07D *237/48*

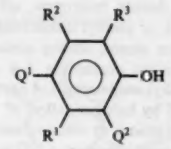
U.S. Cl. 544—325 **4 Claims**

1. A 2,4-diamino-5-benzylpyrimidine compound of the formula



wherein Q^1 is a 2,4-diaminopyrimidin-5-yl-methyl group and R^1, R^2, R^3 and Q^2 are alkyl groups of 1 to 4 carbon atoms.

2. A 2,4-diamino-5-benzylpyrimidine compound of the formula



wherein Q^2 represents a 2,4-diaminopyrimidin-5-yl-methyl group, R^1 and R^2 represent hydrogen atoms and Q^1 and R^3 represent alkyl groups of 1 to 4 carbon atoms.

4,116,959

ISOINDOLINE PIGMENTS

Jost von der Crone, Riehen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

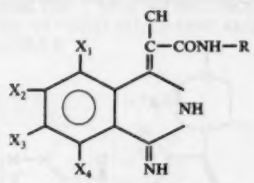
Filed Sep. 20, 1976, Ser. No. 724,828

Claims priority, application Switzerland, Sep. 26, 1975, 12567/75

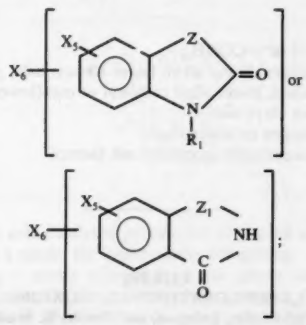
Int. Cl.[2] C09B *57/00*

U.S. Cl. 544—284 **7 Claims**

1. An isoindoline pigment of the formula

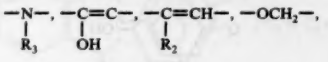


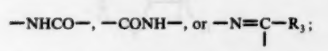
wherein R denotes a radical of the formula

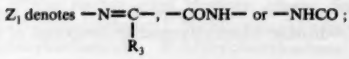


X_1, X_2, X_3, and X_4 denote hydrogen, halogen, or one or two of the radicals X_1–X_4 denote nitro, alkyl, alkoxy or phenoxy and the others denote hydrogen; X_5 denotes hydrogen, halogen, alkyl containing 1–4 carbon atoms, alkoxy containing 1–4 carbon atoms, or phenoxy; X_6 is a direct bond when linked to

the benzene ring or phenylene when linked to the heterocyclic ring; Z denotes O, S, or a group of the formula







wherein R_2 and R_3 denote hydrogen, alkyl containing 1–4 carbon atoms, phenyl, or phenyl substituted by halogen, alkyl containing 1–4 carbon atoms, alkoxy containing 1–4 carbon atoms, or alkanoylamino containing 1–4 carbon atoms; R_1 denotes hydrogen, alkyl containing 1–4 carbon atoms, phenyl, or phenyl substituted by halogen, alkyl of 1–4 carbon atoms, alkoxy of 1–4 carbon atoms, or alkanoylamino containing 1–4 carbon atoms; and Z must represent a NH group when R_1 does not denote hydrogen.

4,116,960

TETRAZOLE-5-CARBOXAMIDE DERIVATIVES

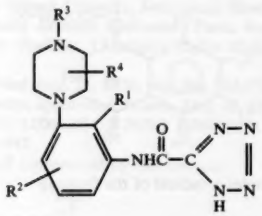
John M. Sellstedt, Pottstown, and Dieter H. Klaubert, West Chester, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 669,570, Mar. 23, 1976, Pat. No. 4,013,647. This application Sep. 24, 1976, Ser. No. 726,374

Int. Cl.[2] C07D *403/12*

U.S. Cl. 544—366 **4 Claims**

1. An anti-allergy compound of the formula:



in which

R^1 is —CN or $—CONH_2$;

R^2 is hydrogen, lower alkyl, lower alkoxy, halo, polyhalo(lower)alkyl, lower alkyl carbonyl or carb(lower)alkoxy;

R^3 is lower alkyl; and

R^4 is hydrogen or lower alkyl;

or a pharmaceutically acceptable salt thereof.

4,116,961

1,2-BENZOXATHIIN-2,2,-DIOXIDES

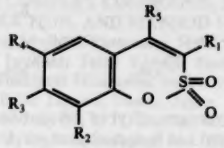
Charles F. Schwender, Lebanon, and Brooks R. Sunday, Hackettstown, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Feb. 24, 1977, Ser. No. 771,502

Int. Cl.[2] C07D *411/04, 327/06*

U.S. Cl. 260—293.57 **14 Claims**

1. A compound of the formula:



wherein R_1 is $N(R_6)$ carbamoyl wherein R_6 is selected from the group consisting of phenyl or lower alkyl of 1 to 6 carbon atoms; wherein R_2 is selected from the grop consisting of hydrogen and phenyl; wherein R_3 is hydrogen; wherein R_4 is hydrogen or halogen; and wherein R_5 is hydroxyl, and the pharmaceutically acceptable chelate salts thereof.

4,116,962

PYRROLIDINE AND PIPERIDINE-2-CARBOXYLIC ACID DERIVATIVES

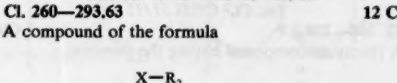
Miguel Angel Ondetti, Princeton, and Frank Lee Weisenborn, Titusville, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Dec. 3, 1976, Ser. No. 747,280

Int. Cl.[2] C07D *211/32, 207/16*

U.S. Cl. 260—293.63 **12 Claims**

1. A compound of the formula



and salts thereof,

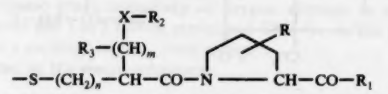
wherein R is hydrogen or hydroxy;

R_1 is hydroxy or lower alkoxy;

R_2 is hydrogen, lower alkyl or lower alkanoyl;

R_3 is hydrogen or lower alkyl;

R_4 is hydrogen, lower alkanoyl, benzoyl or

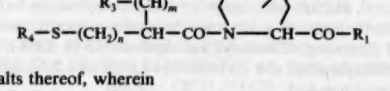


X is oxygen or sulfur;

m is 0, 1, 2, 3 or 4; and

n is 0 or 1.

9. A compound of the formula



and salts thereof, wherein

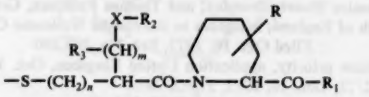
R is hydrogen or hydroxy;

R_1 is hydroxy or lower alkoxy;

R_2 is hydrogen, lower alkyl or lower alkanoyl;

R_3 is hydrogen or lower alkyl;

R_4 is hydrogen, lower alkanoyl, benzoyl or



X is oxygen or sulfur;

m is 0, 1, 2, 3 or 4; and

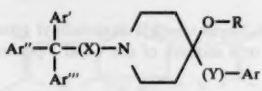
n is 0 or 1.

4,116,963
3,3,3-TRIARYLALKYL-4-PHENYLALKYL-4-HYDROXY PIPERIDINES AND RELATED COMPOUNDS

Gilbert W. Adelstein, Evanston, Ill., assignor to G.D. Searle & Co., Chicago, Ill.

Filed May 23, 1977, Ser. No. 799,864
Int. Cl.[2] C07D *211/48, 401/06*
U.S. Cl. 260—293.69 9 Claims

1. Compounds of the formula



and the pharmaceutically acceptable acid addition salts thereof wherein R represents hydrogen, alkanoyl having 1 to 7 carbon atoms or lower alkyl having 1 to 7 carbon atoms; X and Y represent alkylene having 1 to 3 carbon atoms and Ar, Ar', Ar'' represent phenyl, halosubstituted phenyl, lower alkyl substituted pheynyl wherein the lower alkyl contains 1 to 4 carbon atoms; and Ar''' represents phenyl, pyridyl, lower alkyl substituted phenyl wherein the lower alkyl contains 1 to 4 carbon atoms or halosubstituted phenyl.

4,116,964
2-[(N-2-PYRIDYLCARBAMOYL)METHYL]SACCHARIN

Harold Zinnes, Rockaway; Neil A. Lindo, New Providence, and John Shavel, Jr., Mendham, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 685,011, May 10, 1976, Pat. No. 4,074,048. This application Aug. 16, 1977, Ser. No. 825,012
Int. Cl.[2] C07D *417/12*
U.S. Cl. 260—294.8 C 1 Claim

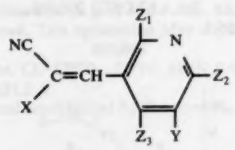
1. 2[N-2-pyridylcarbamoyl)methyl]saccharin.

4,116,965
STYRYL DYESTUFFS CONTAINING CERTAIN AMINO, CYANOPYRIDINE MOIETIES

Nalin Binduprasad Desai, Bombay, India, and Visvanathan Ramanathan, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 566,498, Apr. 9, 1975, abandoned. This application Nov. 18, 1976, Ser. No. 742,924
Claims priority, application Switzerland, Apr. 10, 1974, 5069/74
Int. Cl.[2] C07D *213/57*
U.S. Cl. 260—294.9 12 Claims

1. A styryl dye devoid of acid, water-solubilizing groups, of the formula



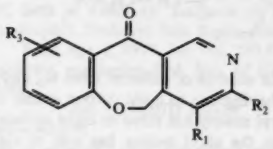
wherein two radicals Z are —NR'R'' and one Z is —NR'R'', —OR''' or SR''' in which R', R'' and R''' are hydrogen, phenyl phenyl substituted by chlorine, bromine, lower alkyl of 1 to 5 carbon atoms, lower alkoxy of 1 to 2 carbon atoms, hydroxyethyl or carbolower alkoxy of 1 to 5 carbon atoms, benzyl, phenethyl, cyclohexyl, C_1–C_8-alkyl, C_1–C_8-alkyl interrupted by an oxygen atom, or C_1–C_8-alkyl substituted by hydroxy, carboxyl, carbo-C_1–C_5-alkoxy, alkoxy, phenoxy, C_1–C_{18}-fatty acid acyloxy, benzoyloxy, C_1–C_{18}-alkylcarbamoyloxy, C_1–C_{18}-alkyloxycarbonyloxy, phenylcarbamoyloxy, phenyloxycarbonyloxy, phenoxyacetoxy, chloroacetoxy, or phenylacetoxy, Z_3 is also lower alkyl of 1 to 5 carbon atoms or phenyl, Y is -CN and X is NC-.

4,116,966
1-BENZOXEPINO[4,3-C]PYRIDINES

Sylvester Klutchko, Hackettstown, and Max von Strandtmann, Rockaway, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 768,258, Feb. 14, 1977, Pat. No. 4,092,322. This application Nov. 21, 1977, Ser. No. 853,618
Int. Cl.[2] C07D *491/04*
U.S. Cl. 260—294.9 3 Claims

1. A compound of the formula:



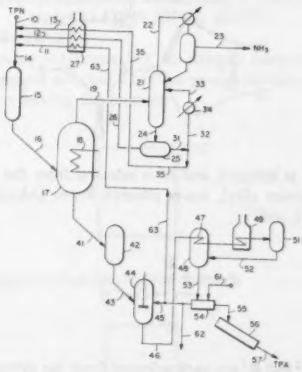
I

wherein R_1 is hydrogen or lower alkyl and R_2 is tetrazolyl and R_3 is hydrogen, lower alkyl, halogen, hydroxy or lower alkoxy.

4,116,967
PRODUCTION OF CARBOXYLIC ACIDS FROM NITRILES

Abraham P. Gelbein, Plainfield, and Morgan C. Sze, Upper Montclair, both of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed Oct. 7, 1976, Ser. No. 730,385
Int. Cl.[2] C07D *213/55;* C07C *63/26*
U.S. Cl. 260—295.5 R 17 Claims



1. In an acid catalyzed process for producing a carboxylic acid from a nitrile, the improvement comprising:

reacting a nitrile selected from the group consisting of nicotinonitrile and aromatic nitriles wherein the aromatic nucleus is selected from the group consisting of benzene and naphthalene and water in the vapor phase in the presence of an acid catalyst in solid form to produce a gaseous effluent containing the corresponding carboxylic acid; and

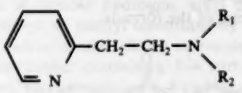
recovering the carboxylic acid from the gaseous effluent by sublimation of the carboxylic acid.

4,116,968
PROCESS FOR THE PRODUCTION OF 2-VINYL PYRIDINE

Peter Hardt, Visp, Switzerland, assignor to Lonza, Ltd., Basel, Switzerland

Filed Nov. 15, 1977, Ser. No. 851,786
Claims priority, application Switzerland, Nov. 15, 1976, 14339/76
Int. Cl.[2] C07D *213/06, 213/38*
U.S. Cl. 260—290 V 8 Claims

1. Process for the production of 2-vinyl pyridine from a 2-(β-substituted ethyl)-pyridine characterized in that a 2-(β-aminoethyl)-pyridine having the formula:



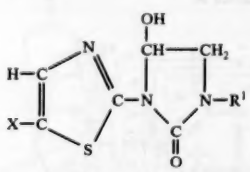
wherein R_1 is the same as or different from R_2, and R_1 and R_2 each are alkyl having one to eight carbon atoms, cycloalkyl, wherein the alkyl moiety has three to eight carbon atoms, or aralkyl, wherein the alkyl moiety has one to eight carbon atoms, or R_1 and R_2 together are a $—(CH_2)_n—$ group, wherein n is 4 or 5, or R_1 and R_2 together are $—(CH_2)_2—O—(CH_2)_2$, is split through the action of a carrier-bound alkalihydroxide, as a catalyst, at a temperature between 100° and 500° C. into 2-vinyl pyridine and the corresponding secondary amine.

4,116,969
1-THIAZOLYL-5-HYDROXYIMIDAZOLIDINONES

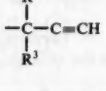
Chin Ching Wu, Libertyville, and John Krenzer, Oak Park, both of Ill., assignors to Velsicol Chemical Company, Chicago, Ill.

Filed Jun. 1, 1976, Ser. No. 691,743
Int. Cl.[2] C07D *277/38*
U.S. Cl. 260—306.8 R 6 Claims

1. A compound of the formula



wherein X is halogen; and R^1 is selected from the group consisting of lower alkyl, lower alkenyl, lower chloralkyl, lower bromoalkyl, and



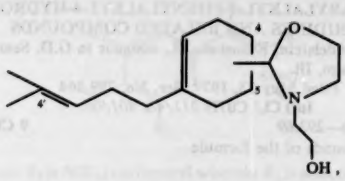
wherein R^2 and R^3 are each selected from the group consisting of hydrogen and lower alkyl.

4,116,970
N-2-HYDROXYETHYL-OXAZOLIDINE COMPOUND

Paul Albert Ochsner, Geneva, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

Filed Jun. 30, 1977, Ser. No. 811,915
Claims priority, application Austria, Jul. 12, 1976, 5109/76
Int. Cl.[2] C07D *263/04*
U.S. Cl. 260—307 FA 1 Claim

1. A compound of the formula:



(II)

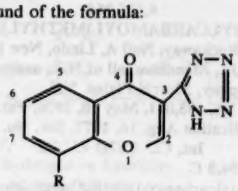
wherein the N-2-hydroxyethyl-oxazolidinyl group is in the 4- or 5-position, or a mixture of the 4-and 5-position isomers of formula II.

4,116,971
3-(1H-TETRAZOL-5-YL)CHROMONES

Max von Strandtmann, New Castle, Del.; Marvin P. Cohen, New Milford, N.J.; Sylvester Klutchko, Ann Arbor, Mich., and John Shavel, Jr., Mendham, N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Aug. 15, 1977, Ser. No. 824,385
Int. Cl.[2] G07D *257/04;* D61K *31/41*
U.S. Cl. 260—308 D 3 Claims

1. A compound of the formula:

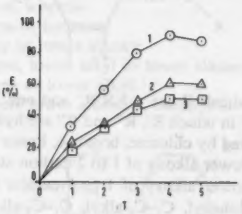


wherein R is lower alkoxy of 1 to 3 carbon atoms.

4,116,972
ANTI-INFLAMMATORY 1-OXO-ISOINDOLINE DERIVATIVES AND PROCESSES FOR THEIR PREPARATION

Tsutomu Kameyama, Tokyo, Japan; Shigetaka Yoshina, deceased, late of Nagoya, Japan by Teruko Yoshina, Takami Yoshina, heir at law, Nagoya, Japan, assignors to Fuji Chemical Industry Company Limited, Kamiichi, Japan

Filed Sep. 7, 1976, Ser. No. 720,675
Claims priority, application Japan, Sep. 11, 1975, 50-110692
Int. Cl.[2] C07D *209/44*
U.S. Cl. 260—326.1 2 Claims



1. Aluminium α-[4-(1-oxo-4,7-dihydro-2-isoindolinyl)-phenyl]propionate.

2. Bismuth α-[4-(1-oxo-4,7-dihydro-2-isoindolinyl)phenyl]-propionate.

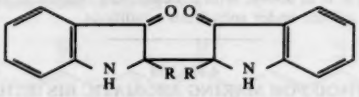
4,116,973

THERMAL SENSITIVE MATERIALS

Kenneth D. Glanz, Appleton, Wis., and David B. McQuain, Dayton, Ohio, assignors to NCR Corporation, Dayton, Ohio

Division of Ser. No. 631,336, Nov. 12, 1975, Pat. No. 3,978,270.
This application May 7, 1976, Ser. No. 684,213
Int. Cl.[2] C09B 7/02; C07D 209/42
U.S. Cl. 260—326.11 R 2 Claims

1. Dehydroindigo di(alkyl acylate) having the following structure wherein R is alkyl acylate having three to nine carbon atoms:



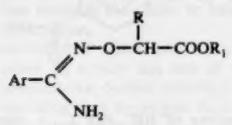
4,116,974

HERBICIDAL AND PHYTOHORMONAL AMIDOXIMES

Daniel Farge, Thiais; Jean Leboul, Gif sur Yvette; Yves Le Goff, Bretigny, Orge, and Gilbert Poiget, Thiais, all of France, assignors to Philagro, France

Filed Sep. 10, 1976, Ser. No. 722,215
Claims priority, application France, Sep. 11, 1975, 75 27884; Jul. 8, 1976, 76 21717
Int. Cl.[2] C07D 333/24; A01N 9/12
U.S. Cl. 260—332.2 A 7 Claims

1. A new amidoxime of the formula



in which

R represents a hydrogen atom or an alkyl group containing 1 to 4 carbon atoms, or a phenyl group,

R_1 represents a hydrogen atom or an alkyl group containing 1 to 4 carbon atoms, or a metal atom and

Ar represents a thienyl group optionally substituted by a halogen atom, an alkyl group having 1 to 4 carbon atoms, alkoxy, alkylthio or phenalkyl in which the alkyl group contains 1 to 4 carbon atoms.

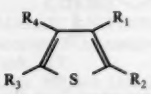
4,116,975

POLYENE COMPOUNDS

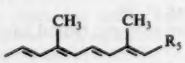
Michael Josef Klaus, Weil am Rhein, Fed. Rep. of Germany, and Beverly Ann Pawson, Montclair, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 733,507, Oct. 18, 1976, Pat. No. 4,061,656, which is a continuation-in-part of Ser. No. 632,029, Nov. 14, 1975, abandoned. This application May 31, 1977, Ser. No. 801,688
Int. Cl.[2] C07D 333/24; A01N 9/00
U.S. Cl. 260—332.2 A 6 Claims

1. A compound represented by the formula



wherein one of R_1 or R_2 is



and the other of R_1 or R_2 and R_3 and R_4 are hydrogen, lower alkoxy-lower alkyl, hydroxy methyl, halogen, lower alkyl, lower alkoxy, amino, carboxyl, mono(lower alkyl)amino, lower alkylthio, di(lower alkyl)amino, mono(lower alkyl-)amino lower alkyl, di(lower alkyl)amino lower alkyl, hydroxy, lower alkenyl, lower alkenoxy, lower alkanoyl, lower alkanoyloxy, nitro, lower alkoxycarbonyl, lower alkanoylamido or a nitrogen containing heterocycle; and R_5 is carbamoyl, mono(lower alkyl)carbamoyl, and di(lower alkyl)-carbamoyl.

4,116,976

METHOD OF PREPARING PHTHALIDE

Fritz Englander, Bonn-Bad Godesberg, and Jurgen Amort, Troisdorf, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf Bez, Koeln, Germany

Filed Apr. 1, 1977, Ser. No. 783,575
Claims priority, application Fed. Rep. of Germany, Apr. 2, 1976, 2614294
Int. Cl.[2] C07D 307/88
U.S. Cl. 260—343.3 R 8 Claims

1. Process of preparing phthalide which comprises contacting 3-chlorophthalide with hydrogen in the presence of noble metal catalyst, at between about 50° and about 250° C. in the absence of HCL acceptors, for hydrogenolysis of the 3-chlorophthalide.

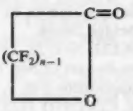
4,116,977

PROCESS FOR PRODUCING OXYGEN-CONTAINING CYCLIC FLUORO COMPOUND

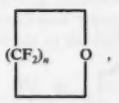
Masaaki Yamabe, Machida; Kiyotaka Arai, Yokohama; Shunichi Samejima, Tokyo, and Makoto Noshiro, Yokohama, all of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed Aug. 5, 1976, Ser. No. 711,978
Claims priority, application Japan, Aug. 5, 1975, 50-94736
Int. Cl.[2] C07D 307/32, 307/04
U.S. Cl. 260—343.6 9 Claims

1. A process for producing an oxygen containing cyclic fluoro compound selected from the group consisting of a perfluorolactone having the formula



a perfluorocyclic ether having the formula



and mixtures thereof which comprises:

reacting an α, ω-diiodoperfluoroalkane compound having the formula

$$I(CF_2)_nI$$

with fuming sulfuric acid, wherein n in wll formulas ranges from 3 to 5.

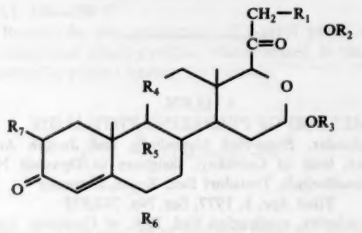
4,116,978

D-HOMO OXASTEROIDS

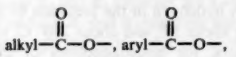
Christopher M. Cimarusti, Hamilton Square; Paul Grabowich, New Brunswick, and Ravi K. Varma, Belle Mead, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jul. 20, 1977, Ser. No. 817,315
Int. Cl.[2] C07D *311/02*; A61K *31/35*
U.S. Cl. 260—345.2 **25 Claims**

1. A steroid having the formula,



or the 1,2-dehydro derivative thereof; wherein R_1 is hydrogen,



halogen or hydroxy; R_2 is hydrogen or alkyl; R_3 is alkyl; R_4 is carbonyl, β-hydroxymethylene, β-chloromethylene or β-bromomethylene; R_5 is hydrogen, fluorine, chlorine or bromine; R_6 is hydrogen, fluorine or methyl; and R_7 is hydrogen, chlorine or bromine; with the proviso that when R_1 is hydroxy, R_2 is alkyl; and with the further proviso that when R_2 is alkyl, it is the same alkyl group as R_3; wherein aryl is phenyl or phenyl substituted with one or two alkyl, alkoxy or halogen groups; and alkyl and alkoxy are groups having 1 to 10 carbon atoms.

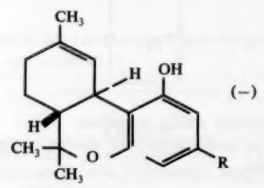
4,116,979

PROCESS FOR THE PREPARATION OF (−)-6A,10A-TRANS-6A,7,8,10A-TETRAHYDRODIBENZO[B,D]-PYRANS

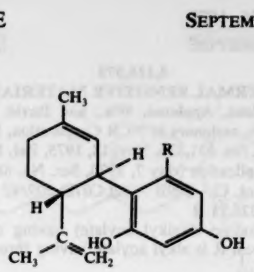
Raj Kumar Razdan, Belmont, and Haldean Cloyce Dalzell, Weston, both of Mass., assignors to Sheehan Institute for Research, Inc., Cambridge, Mass.

Division of Ser. No. 636,132, Nov. 28, 1975, Pat. No. 4,025,516, which is a continuation-in-part of Ser. No. 589,742, Jun. 24, 1975, abandoned. This application Feb. 7, 1977, Ser. No. 766,435
Int. Cl.[2] C07D *311/78*
U.S. Cl. 260—345.3 **7 Claims**

1. A process for the preparation of a compound of the formula



wherein R is hydrogen or a straight or branched alkyl containing 1 to 10 carbon atoms, comprising treating a compound of the formula



wherein R is as above, with a Lewis acid catalyst in an inert organic solvent under anhydrous conditions.

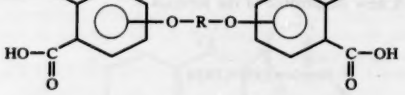
4,116,980

METHOD FOR MAKING AROMATIC BIS (ETHER PHTHALIC ACID) OR AROMATIC BIS (ETHER ANHYDRIDE)S

Jimmy L. Webb, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,127
Int. Cl.[2] C07D *307/89*
U.S. Cl. 260—346.3 **12 Claims**

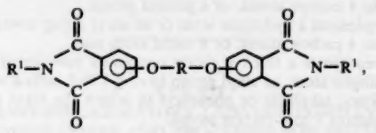
1. A method for making aromatic bis(ether phthalic acid) of the formula,



which comprises,

(A) heating at a temperature of 100°–300° C., a mixture comprising by weight

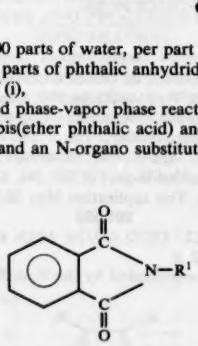
(i) aromatic bis(ether phthalimide) of the formula,



(ii) 0.01 to 100 parts of water, per part of (i)

(iii) 0.3 to 20 parts of phthalic anhydride or phthalic acid per part of (i),

to produce a liquid phase-vapor phase reaction mixture, comprising aromatic bis(ether phthalic acid) and phthalic acid in the liquid phase, and an N-organo substituted phthalimide of the formula,



in the vapor phase,

(B) venting the vapor phase from the reaction mixture of (A), and

(C) recovering the aromatic bis(ether phthalic acid) from the resulting mixture of (B),

where R is a divalent aromatic radical having from 6–30 carbon atoms and R^1 is a monovalent organo radical selected from the class consisting of $C_{(1-8)}$ alkyl radicals, and organic radicals having from 6–20 carbon atoms, selected from the class con-

sisting of aromatic hydrocarbon radicals and halogenated derivatives thereof.

4,116,981

5,12-EPOXY-NAPHTHACENE-6,11-DIONE DERIVATIVES

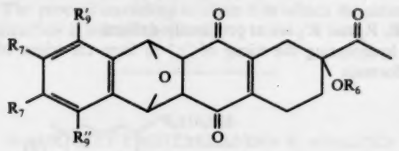
Andrew S. Kende, Pittsford, N.Y., assignor to Yuh-Geng Tsay, Taichung, Taiwan and Research Corporation, New York, N.Y.

Filed May 2, 1977, Ser. No. 792,684

Int. Cl.[2] C07D *307/87*

U.S. Cl. 260—346.71 **7 Claims**

1. A compound of the formula



wherein

R_6 is lower alkanoyl or phenyl lower alkanoyl,

R_7 is hydrogen, lower alkyl, or halogen of the group chlorine or bromine,

R_9 is hydrogen, lower alkyl, or lower alkoxy, phenyl- or substituted phenyl lower alkyl wherein the substituent groups are lower alkyl, lower alkoxy or halo,

wherein the partial term "lower alk" signifies a straight or branch chain hydrocarbon moiety containing 1 to 5 carbon atoms in the chain, or halogen of the group chlorine or bromine,

provided that where one R_9 moiety is lower alkoxy, the other R_9 moiety has one of the alternate values given hereinabove, further provided that where both R_7 groups are other than hydrogen, R_9 is hydrogen and where R_9 is other than hydrogen, R_7 is hydrogen.

4,116,982

3-OXIMINO-4-OXO-2,5-DIMETHYL-TETRAHYDROFURAN

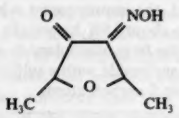
Manfred Baumann, Mannheim; Werner Hoffmann, Neuhofen, and Karl von Fraunberg, Bobenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 30, 1977, Ser. No. 811,461

Int. Cl.[2] C07D *307/32*

U.S. Cl. 260—347.7 **1 Claim**

1. 3-Oximino-4-oxo-2,5-dimethyl-tetrahydrofuran of the formula



4,116,983

TWO STAGE MALEIC ANHYDRIDE PROCESS

John P. Schmidt, Princeton, N.J., assignor to Halcon International, Inc., New York, N.Y.

Continuation of Ser. No. 408,344, Oct. 23, 1973, abandoned. This application May 24, 1977, Ser. No. 800,141

Int. Cl.[2] C07D *307/60*

U.S. Cl. 260—346.75 **4 Claims**

1. A process for producing maleic anhydride which comprises oxidizing benzene with molecular oxygen in a first oxidation zone, in the presence of a catalyst comprising vanadium and molybdenum, said benzene being introduced into said zone as a vapor in admixture with air in a concentration of about 1 to 2 mol percent, withdrawing a gaseous stream from the outlet of said zone, and without cooling said gaseous stream, introducing substantially only benzene into said stream to provide a benzene concentration of about 0.8 to 1.8 mol percent in said withdrawn stream, and introducing the resulting benzene-enriched stream into a second oxidation zone containing a catalyst comprising vanadium and molybdenum to oxidize the benzene in said stream with the molecular oxygen in said stream, said first oxidation zone being at a temperature within the range of 330° –425° C., said second oxidation zone being substantially at least at the temperature of said first oxidation zone and the gaseous feed to the first oxidation zone being at a pressure of 10–60 psig and being caused to flow at a space velocity of 1800 to 3500 hr. $^{-1}$

4,116,984

MANUFACTURE OF ISOMERIC 1,4-DIBROMO-EPOXY-CYCLOHEXENES

Horst Prinzbach, and Reinhard Schwesinger, both of Freiburg, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 2, 1976, Ser. No. 710,459

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1975, 2537681

Int. Cl.[2] C07D *303/08, 301/32*

U.S. Cl. 260—348.12 **6 Claims**

1. A process for increasing the concentration of a particular isomer of 1,4-dibromo-epoxy-cyclohexene in an isomeric mixture of 1,4-dibromo-epoxy-cyclohexenes by establishing a given isomerization equilibrium which comprises;

dissolving said mixture of 1,4-dibromo-epoxy-cyclohexenes in a solvent selected from the group consisting of acetonitrile, methylene chloride, carbon tetrachloride, tetrahydrofuran, benzene, methanol and acetone, acetonitrile being selected as a solvent where the concentration of the endo,endo isomer is to be increased; methylene chloride, carbon tetrachloride, tetrahydrofuran being selected as a solvent where the concentration of the exo,exo isomer is to be increased; and benzene, methanol or acetone being selected as a solvent where the concentration of the endo,exo isomer is to be increased; and

allowing the mixture to stand in the presence of a catalytic amount of a soluble bromide salt until said isomerization equilibrium is reached.

4,116,985

NOVEL METHOD FOR PREPARING CHOLESTA-5,7-DIENE 3β,25-DIOL AND DERIVATIVES THEREOF

William G. Salmond, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Jul. 26, 1976, Ser. No. 708,823

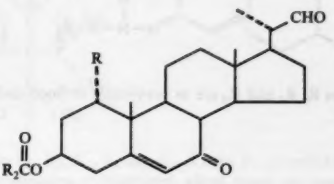
The portion of the term of this patent subsequent to Nov. 30, 1993, has been disclaimed.

Int. Cl.[2] C07J *9/00*

U.S. Cl. 260—397.2 **90 Claims**

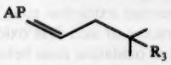
1. A process for preparing cholesta-5,7-diene-3β,25-diol or cholesta-5,7-diene-1α,3β,25-triol which comprises

a. contacting an aldehyde of the formula



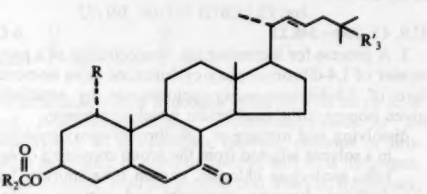
wherein R is hydrogen, hydroxy or

wherein R_1 and R_2 are the same or different and are alkyl of one to six carbon atoms, inclusive, or phenyl with an ylide of the formula



wherein A is the portion of a Wittig reagent of the type $AP{=}CH_2$ and is inert to the reaction medium and R_3 is $O^{\ominus}$ or

wherein R_4 is alkyl of one to six carbon atoms, inclusive, or phenyl to form a steroid of the formula



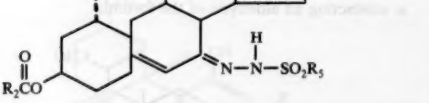
wherein R and R_2 are as defined previously and R'_3 is R_3 or, upon quenching the oxyanion, OH,

b. reacting the Δ^{22} steroid formed in "a" wherein R'_3 is OH or

with an aryl sulfonyl hydrazide

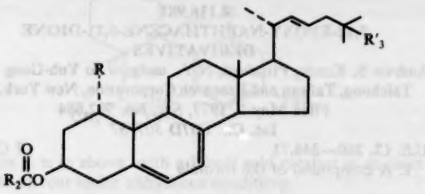
$R_5SO_2NHNH_2$

in an organic solvent wherein R_5 is phenyl or phenyl substituted with one to two alkyl groups, each alkyl group being the same or different and having one to three carbon atoms, inclusive, forming a sulfonyl hydrazone of the formula



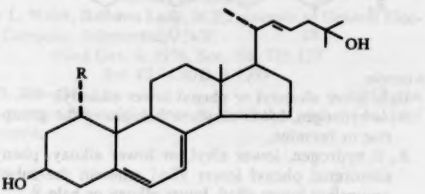
wherein R, R_2 and R_5 are as previously defined and R'_3 is OH or

c. contacting the sulfonyl hydrazone of "b" with a hydride in an organic solvent to form a triene of the formula



R, R_2 and R'_3 are as previously defined;

d. hydrolyzing the triene of "c" to form the triene of the formula



wherein R is hydrogen or hydroxy;

e. selectively reducing the Δ^{22} bond of the triene of step "d" with

(1) biscyclopentadienyl zirconium dihydride in an organic solvent, or

(2) chloridohydridobiscyclopentadienyl zirconium in an organic solvent followed by contact with a hydride reducing agent, and

f. contacting the compound formed in step "e" with acid.

4,116,986

PROCESS FOR SULFATING FATTY ALKANOLAMIDES

Raymond G. Bistline, Jr., Wyndmoor; Warner M. Linfield, Oreland, and Wilfred R. Noble, Wyndmoor, all of Pa., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 6, 1977, Ser. No. 794,596

Int. Cl.[2] C07C *143/90*; C11D *1/28*

U.S. Cl. 260—401 **8 Claims**

1. In a process for preparing sulfated fatty alkanolamides wherein fatty acids and fatty acid esters are reacted with low molecular weight alkanolamines and the resultant fatty alkanolamide sulfated, the improvement which comprises adding from about 5 to about 15% by weight of a low molecular weight alcohol to the fatty alkanolamide and co-sulfating the alcohol and the alkanolamide with a sulfating agent, said alcohol having from 1 to 8 carbon atoms.

4,116,987

METHOD OF HYDROXYLATION

Norman C. Deno, State College, Pa., assignor to Fats and Proteins Research Foundation, Inc., Des Plaines, Ill.

Division of Ser. No. 622,661, Oct. 15, 1975, Pat. No. 4,045,498. This application Mar. 21, 1977, Ser. No. 779,467

Int. Cl.[2] C11C *3/02*

U.S. Cl. 260—410.9 R **3 Claims**

1. The process of preparing alcohols by single-carbon hydroxylation, which comprises the steps of: reacting a saturated hydrocarbon compound with an N-oxygenated amine in a medium including a Lewis acid and a salt of a first series transition metal element; and separating the reaction product from said medium, in which the saturated hydrocarbon compound has the general formula

wherein R_1 and R_2 are hydrocarbon groups which have combined a total of from 4 to 18 carbon atoms and wherein the dotted line represents an optional carbon-to-carbon bond, R_1 and R_2 being alkyl groups when said bond is absent and R_1 and R_2 being alkylene groups when said bond is present. and wherein one of R_1 and R_2 includes a carboxyl moiety.

2. The process according to claim 1 in which the saturated hydrocarbon is methyl octanoate.

4,116,988

16-PHENOXY PROSTAGLANDIN E_1 ANALOGS

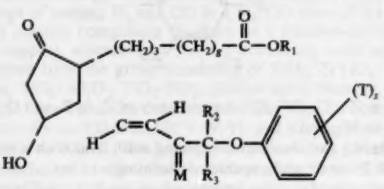
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 426,058, Dec. 19, 1973, which is a continuation of Ser. No. 252,030, May 10, 1972. This application Feb. 7, 1977, Ser. No. 766,010

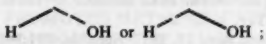
Int. Cl.[2] C07C *177/00*

U.S. Cl. 260—413 **10 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein *g* is an integer from 2 to 5, incusive; wherein M is



wherein R_1 is hydroen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_2 and R_3 are hydrogen, methyl, or ethyl; wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or —OR_4 wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein *s* is zero one, 2, or 3, with the proviso that not more than two T's are other than akyl; including each of the lower dialkanoates thereof, and each of the pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,116,989

16-PHENOXY PROSTAGLANDIN $F_{1\alpha}$ ANALOGS

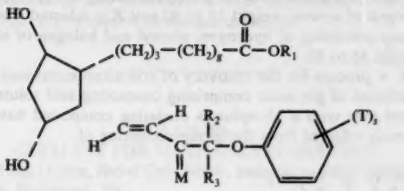
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 426,058, Dec. 19, 1973, which is a division of Ser. No. 252,030, May 10, 1972. This application Feb. 7, 1977, Ser. No. 766,011

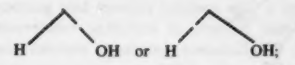
Int. Cl.[2] C07C *177/00*

U.S. Cl. 260—413 **10 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein *g* is an integer from 2 to 5, inclusive; wherein M is



wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_2 and R_3 are hydrogen, methyl, or ethyl; wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or —OR_4 wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein *s* is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl; including each of the lower trialkanoates thereof, and each of the pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,116,990

CHELATION

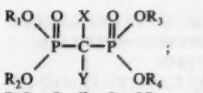
Edward G. Budnick, Scotch Plains, N.J., assignor to Plains Chemical Development Co., Scotch Plains, N.J.

Division of Ser. No. 33,513, Apr. 30, 1970, Pat. No. 4,020,091, and a continuation-in-part of Ser. No. 505,471, Oct. 28, 1965, abandoned, and Ser. No. 813,385, Feb. 28, 1969, abandoned, and a continuation-in-part of Ser. No. 485,624, Sep. 7, 1965, Pat. No. 3,471,406, and Ser. No. 482,257, Jun. 24, 1974, Pat. No. 3,471,552. This application May 20, 1976, Ser. No. 688,388

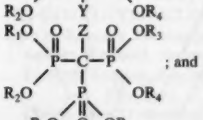
Int. Cl.[2] C07F *1/00, 7/22, 7/24, 9/38*

U.S. Cl. 260—429 J **23 Claims**

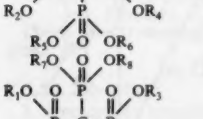
1. A process for chelating non-alkali metal ions comprising contacting said metal ions with a phosphorus chelating compound having a formula selected from the group consisting of:



(a)



(b)

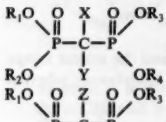


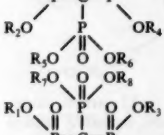
(c)

wherein R_1, R_2, R_3, R_4, R_5, R_6, R_7 and R_8 are selected from the group consisting of hydrogen, alkali metal and ammonium, X is selected from the group consisting of hydrogen, alkenyl, aryl, chloroalkyl, chloroaryl, and halogen of atomic weight 35

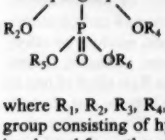
to 80, Y is selected from the group consisting of hydroxyl, and halogen of atomic weight 35 to 80 and Z is selected from the group consisting of hydrogen, phenyl and halogen of atomic weight 35 to 80.

8. A process for the recovery of non-alkali metal ions from a solution of the same comprising contacting said solution of metal ions with a phosphorus chelating compound having a formula selected from the group consisting of:


(a)


(b)

; and


(c)

where R_1, R_2, R_3, R_4, R_5, R_6, R_7 and R_8 are selected from the group consisting of hydrogen, alkali metal and ammonium, X is selected from the group consisting of hydrogen, alkyl, alkenyl, aryl, chloroalkyl, chloroaryl, and halogen of atomic weight 35 to 80, Y is selected from the group consisting of hydroxyl, phenyl and halogen of atomic weight 35 to 80 and Z is selected from the group consisting of hydrogen, phenyl and halogen of atomic weight 35 to 80, thereafter evaporating the solvent to obtain the chelated metal in a complex form and recovering the metal from said metal complex.

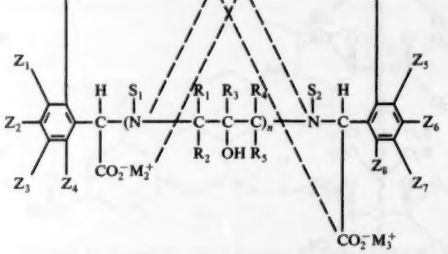
4,116,991

HYDROXY-CONTAINING AGENTS FOR CHELATING METAL IONS AND A PROCESS FOR PREPARING SAME

Andre Leneuf, Tours, France, assignor to Manufacture de Produits Chimiques Protex, Paris, France

Filed Apr. 14, 1975, Ser. No. 567,528
Claims priority, application France, Apr. 12, 1974, 74 13622
Int. Cl.[2] C07F *15/02*
U.S. Cl. 260—439 R **1 Claim**

1. A process for preparing a compound of the following formula:



wherein

R_1 through R_5 are each selected from the group which consists of hydrogen, methyl, ethyl and propyl;

S_1 and S_2 are each selected from the group which consists of hydrogen, $—CH_2CH_2OH$ and alkyl having 1 to 12 carbon atoms;

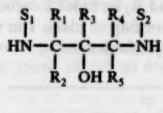
n is a whole number 1 through 4;

Z_1 through Z_8 are substituents each selected from the group which consists of alkyl, alkoxyl, carboxy, formyl, acyl, carboxy substituted by alkyl, carboxamido, hydroxyl, amino, nitro, halo, and sulfo;

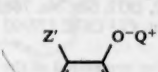
M_1 through M_4 are selected from the group which consists of hydrogen ion, an alkali metal ion, ammonium and ammonium substituted by alkyl 1 to 4 times;

N is divalent or trivalent iron of the above complex; and which comprises:

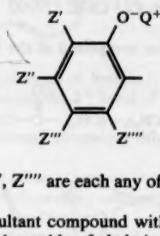
reacting a compound of the following formula:



simultaneously with a compound of the formula:



and simultaneously as well with a compound of the formula:



wherein Z', Z'', Z''', Z'''' are each any of Z_1 to Z_8 and Q is any of M_1 to M_4; and

chelating the resultant compound with iron with a valence of 2^+ or 3^+ and capable of chelating.

4,116,992

PROCESS FOR THE SIMULTANEOUS MANUFACTURE OF DIMETHYLALUMINUM CHLORIDE AND ALKYLALUMINUM CHLORIDES

Scott H. Eidt, Seabrook, Tex., assignor to Texas Alkyls, Inc., Deer Park, Tex.

Filed Apr. 27, 1977, Ser. No. 791,361
Int. Cl.[2] C07F *5/06*
U.S. Cl. 260—448 A **12 Claims**

1. A redistribution process for the production of dimethylaluminum chloride and alkylaluminum chlorides comprising forming a mixture comprising methylaluminum dichloride and at least one alkylaluminum compound selected from the group consisting of an aluminum trialkyl, a dialkylaluminum chloride, and an alkylaluminum sesquichloride, in which the alkyl group contains from 2 to 16 carbon atoms, such mixture having a chlorine-to-aluminum atomic ratio of from about 1.0 to about 2.0, and distilling said mixture in an efficient distillation column to effect separation of said mixture into a first fraction consisting essentially of dimethylaluminum chloride and a residue of alkylaluminum chlorides.

4,116,993

PROCESS FOR PRODUCING AROMATIC-CONTAINING SILICONE COMPOUNDS

Ben Alfred Bluestein, Schenectady, and E. Robert Evans, Clifton Park, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Filed Jul. 5, 1977, Ser. No. 812,954
Int. Cl.[2] C07F *7/08, 7/12, 7/18*
U.S. Cl. 260—448.2 E **14 Claims**

1. An improved process for producing an aromatic containing silicone compound comprising (a) reacting a aromatic

organic compound of the formula, RX_a with a silicone compound of the formula, R_b' Si Z_{4-b} in the presence of molar quantities of Mg and from 0.5 up to 1 mole of a promoter per mole of the aromatic compound which is tetrahydrofuran wherein a portion of the reactants are added to the reaction chamber and then adding from 0.1 to 1% by weight of the total reactants of Cu_2Cl_2 as a coupler and then after a reaction period of time of 1 to 5 hours there is mixed into the reaction mixture the remaining portion of the reactants; and (b) distilling out the desired product where R is selected from the class consisting of monovalent and divalent mononuclear and binuclear aryl radicals, X is chlorine, *a* is a whole number that varies from 1 to 4, R′ is a radical selected from the class consisting of monovalent hydrocarbon radicals. Z is selected from the class consisting of halogen and hydrocarbonoxy radicals and *b* varies 0 to 3.

4,116,994

HYDROCARBON SYNTHESIS FROM CO AND H_2 USING RH SUPPORTED ON TITANIUM OXIDES

M. Albert Vannice, Plainfield, and Robert L. Garten, Summit, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 673,358, Apr. 5, 1976, abandoned. This application Jul. 28, 1977, Ser. No. 819,871

Int. Cl.[2] C07C *1/04*

U.S. Cl. 260—449 R **21 Claims**

1. A process for the enhanced synthesis of olefins and paraffins, wherein said paraffins are other than methane, comprising the steps of passing H_2 and CO in a H_2/CO ratio of 0.1 to 10 over a catalyst comprising rhodium on a titanium-containing oxide support, wherein said titanium-containing oxide support is selected from the group consisting of TiO_2, $ZrTiO_4$, TiO_2-carbon, TiO_2-Al_2O_3, TiO_2-SiO_2, alkaline earth titanates, alkali titanates, rare earth titanates and mixtures thereof, at a space velocity of from 100 to 50,000 V/V/Hr and at a temperature of from 100° to 500° C., at a pressure of from 100 to 10^5 kPa for a time sufficient to effect the generation of the desired olefinic and paraffinic products in the desired ratio, wherein the concentration of said rhodium in said catalyst is from 0.01 to 10% by weight.

4,116,995

HYDROCARBON SYNTHESIS USING A RARE EARTH PROMOTED METAL SILICATE

Thaddeus P. Kobylinski, and Harold E. Swift, both of Gibsonia, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Nov. 29, 1976, Ser. No. 745,630

The portion of the term of this patent subsequent to Mar. 30, 1993, has been disclaimed.

Int. Cl.[2] C07C *27/06*

U.S. Cl. 260—449.6 M **33 Claims**

1. A process which comprises contacting a charge stock comprising hydrogen and at least one carbon oxide selected from the group consisting of CO and CO_2 wherein the molar ratio of hydrogen to combined carbon oxide is from 1:1 to 4:1 under reaction conditions including a temperature of from 300° F. to 500° F. with a catalyst consisting essentially of a rare earth promoted metal silicate characterized as having repeating units of the structural formula:

$$[(1=x)Ni^a + xRu^b]_n(OH)_4Si_2O_5 \cdot wH_2O$$

where *x* is a number from 0 to 1, this number expressing the atomic fraction of the metals nickel and ruthenium; *a* is the valence of nickel; *b* is the valence of ruthenium; *n* is a number equal in value to that defined by the ratio

$$6/[a(1=x) + bx]$$

and *w* is a number ranging from 0 to 4;

and thereafter recovering a product, which product, on a methane-free hydrocarbon basis contains at least 60 mole percent of low molecular weight hydrocarbons having from 2 to 6 carbon atoms per molecule.

4,116,996

CATALYST FOR METHANE PRODUCTION

Yun-Yang Huang, Royal Oak, Mich., assignor to Ethyl Corporation, Richmond, Va.

Filed Jun. 6, 1977, Ser. No. 803,958

Int. Cl.[2] C07C *1/04*

U.S. Cl. 260—449.6 M **10 Claims**

1. A process for the conversion of a gaseous reactant mixture comprising carbon monoxide and hydrogen to methane, comprising contacting said gaseous mixture with a catalyst at an elevated temperature sufficient to convert said mixture to methane, said catalyst consisting essentially of (i) an alkali metal, (ii) activated carbon, and (iii) at least one halide of a transition metal selected from Group VIII of the Periodic Table, wherein the weight ratio of said transition metal halide to activated carbon is approximately 0.01–1.0:1, and of said alkali metal to activated carbon and transition metal halide is approximately 0.1–0.5:1.

4,116,997

METHOD FOR THE PREPARATION OF CARBONIC ACID MONOESTER SALTS

Gioacchino Cipriani, and Carlo Neri, both of San Donato Milanese, Italy, assignors to Anic, S.p.A., Palermo, Italy

Continuation of Ser. No. 639,444, Dec. 10, 1975, abandoned. This application May 24, 1977, Ser. No. 800,045

Claims priority, application Italy, Dec. 10, 1974, 30338 A/74

Int. Cl.[2] C07C *68/04*

U.S. Cl. 260—463 **2 Claims**

1. A method for the preparation of $KOCOOCH_3$ by the process which consists of reacting K_2CO_3 with an excess of CO_2 and methanol.

2. A method for the preparation of $Ca(OCOOCH_2CH{=}CH_2)_2$ by the process which consists of reacting CaO with an excess of CO_2 and allyl alcohol.

4,116,998

PREPARATION OF ESTERS OF M-PHENOXYBENZYL ALCOHOL AND ITS α-CYANO AND α-ETHINYL DERIVATIVES WITH 2,2-DIMETHYLCYCLOPROPANECARBOXYLIC ACIDS

George Kenneth Makinson, and David Schofield, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Apr. 4, 1977, Ser. No. 784,635

Claims priority, application United Kingdom, Apr. 15, 1976, 15583/76

Int. Cl.[2] C07B *121/66*

U.S. Cl. 260—465 D **9 Claims**

1. A process for preparing insecticidal esters of m-phenoxybenzyl alcohol and its α-cyano and α-ethinyl derivatives with a 2,2-dimethylcyclopropanecarboxylic acid which comprises mixing a methyl or ethyl ester of the carboxylic acid, an ester of m-phenoxybenzyl alcohol or its α-cyano or α-ethinyl derivative with an acid of formula $R.CO_2H$ wherein R is an alkyl group containing not more than 3 carbon atoms, and tetramethyl or tetraethyl titanate and heating the mixture at a temperature such that the methyl or ethyl ester of the acid formula RCO_2H is removed by distillation as it is formed.

4,116,999

RECOVERY OF TEREPHTHALONITRILE

Richard K. Barchas, Upper Montclair, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed Apr. 28, 1977, Ser. No. 791,838

Int. Cl.[2] C07C *120/14, 121/58*

U.S. Cl. 260—465 H **9 Claims**

1. A process for separating terephthalonitrile from a solution containing terephthalonitrile and p-xylene, comprising:

introducing a solution containing terephthalonitrile and p-xylene and p-tolunitrile into a fractional distillation column, said p-tolunitrile being present in an amount sufficient to solubilize the terephthalonitrile in all portions of the fractional distillation column at which the temperature in the fractional distillation column is below the melting point of terephthalonitrile; and

recovering terephthalonitrile in liquid from the fractional distillation column.

4,117,000

PROCESS FOR PREPARING 4-OXOCAPRONITRILE

Theodorus Balg, Brunssum; Constant M. A. Cramers, Obbicht, and Hendrikus J. G. Maessen, Roermond, all of Netherlands, assignors to Stamicarbon, B.V., Geleen, Netherlands

Filed Aug. 24, 1977, Ser. No. 827,334

Claims priority, application Netherlands, Aug. 26, 1976, 7609478

Int. Cl.[2] C07C *121/34, 120/00*

U.S. Cl. 260—465.1 **3 Claims**

1. In a process for the preparation of 4-oxocapronitrile by reacting excess acetone with acrylonitrile by means of a primary amine and/or Schiff base as a catalyst and in the presence of an acidic compound, in which the amount of oxygen dissolved in the reaction mixture is kept below 20 parts by weight per million, and the unconsumed reactants and the catalyst are distilled off from the resulting reaction mixture and the 4-oxocapronitrile product is recovered from the remaining residue, the improvements consisting essentially in that the said distillation of unconsumed reactants and the catalyst is conducted at a pressure not less than atmospheric in the presence of a sufficient amount of an inert solvent having a boiling point of between about 80° and 195° C., such that a bottom temperature below about 195° C. is maintained.

4,117,001

PYROLYSIS OF HEAVIES FORMED IN PRODUCTION OF UNSATURATED DINITRILES

George B. Fozzard, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 5, 1977, Ser. No. 813,063

Int. Cl.[2] C07C *120/00, 121/20, 121/70*

U.S. Cl. 260—465.8 R **31 Claims**

1. A process which comprises reacting (a) at least one olefinically unsaturated mononitrile reactant and (b) at least one monoadduct of an olefinic hydrocarbon compound and an olefinically unsaturated mononitrile compound under reaction conditions suitable to produce at least one desired olefinically unsaturated dinitrile product and undesired compounds having higher boiling points than said at least one desired olefinically unsaturated dinitrile product, each of said olefinically unsaturated mononitrile reactant and said olefinically unsaturated mononitrile compound containing a cyano group attached to a carbon atom adjacent and doubly bonded to a carbon atom which is attached to at least one hydrogen atom, said olefinic hydrocarbon compound having at least one olefinic linkage having joined to one of the doubly bonded carbons thereof a carbon atom having at least one hydrogen atom attached thereto;

separating the resulting reaction effluent to produce a first fraction comprising said at least one desired olefinically unsaturated dinitrile product and a second fraction comprising said undesired compounds;

distilling said second fraction to produce a light cut and a heavy cut thereof;

subjecting said light cut to pyrolysis conditions in a pyrolysis reaction zone containing particulate heat transfer material to decompose at least a portion of the undesired compounds contained therein to thereby produce a decomposition product comprising at least one of said at least one olefinically unsaturated mononitrile reactant, said at least one monoadduct, said olefinic hydrocarbon compound and said olefinically unsaturated mononitrile compound; and

recovering said decomposition product from the resulting pyrolysis effluent.

4,117,002

PYROLYSIS OF HEAVIES FORMED IN PRODUCTION OF UNSATURATED DINITRILES

Charles A. Drake, Nowata, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 5, 1977, Ser. No. 813,062

Int. Cl.[2] C07C *120/00, 121/20, 121/70*

U.S. Cl. 260—465.8 R **28 Claims**

1. A process which comprises reacting (a) at least one olefinically unsaturated mononitrile reactant and (b) at least one monoadduct of an olefinic hydrocarbon compound and an olefinically unsaturated mononitrile compound under reaction conditions suitable to produce at least one desired olefinically unsaturated dinitrile product and at least one undesired compound having a higher boiling point than said at least one desired olefinically unsaturated dinitrile product, each of said olefinically unsaturated mononitrile reactant and said olefinically unsaturated mononitrile compound containing a cyano group attached to a carbon atom adjacent and doubly bonded to a carbon atom which is attached to at least one hydrogen atom, said olefinic hydrocarbon compound having at least one olefinic linkage having joined to one of the doubly bonded carbons thereof a carbon atom having at least one hydrogen atom attached thereto;

separating the resulting reaction effluent to produce a first fraction comprising said at least one desired olefinically unsaturated dinitrile product and a second fraction comprising said at least one undesired compound;

subjecting said second fraction to pyrolysis conditions to decompose at least a portion of said at least one undesired compound to thereby produce a decomposition product comprising at least one of said at least one olefinically unsaturated mononitrile reactant, said at least one monoadduct, said olefinic hydrocarbon compound and said olefinically unsaturated mononitrile compound; and

recovering said decomposition product from the resulting pyrolysis effluent.

4,117,003

SUBSTITUTED AROMATIC NAPHTHALENE SULFONAMIDES

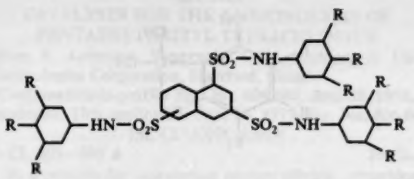
Ransom Brown Conrow, Pearl River, and Seymour Bernstein, New City, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Mar. 28, 1977, Ser. No. 782,210

Int. Cl.[2] C07C *143/56;* **A61K** *31/185*

U.S. Cl. 260—510 **7 Claims**

1. A compound of the formula:



wherein R is selected from the group consisting of hydrogen and $-SO_3A$, wherein A is a non-toxic pharmaceutically acceptable salt cation; with the proviso that each phenyl must contain at least one $-SO_3A$, and that no phenyl may contain three $-SO_3A$.

4,117,004

MANUFACTURE OF AMIDOSULFONIC ACIDS

Roman Fischer, Mutterstadt, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen am Rhein, Fed. Rep. of Germany

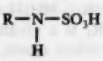
Continuation of Ser. No. 570,612, Apr. 23, 1975, abandoned. This application Aug. 5, 1977, Ser. No. 822,149

Claims priority, application Fed. Rep. of Germany, May 20, 1974, 2424371

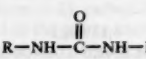
Int. Cl.[2] C07C *143/86*

U.S. Cl. 260—513.6 **10 Claims**

1. A process for the manufacture of an amidosulfonic acid of the formula



where R is an alkyl of 1 to 12 carbon atoms or cyclohexyl optionally substituted by alkyl of 1 to 4 carbon atoms, which comprises the first step of reacting at $-20°$ C to 140° C an urea of the formula



wherein R has the above meanings, with 1 to 1.9 moles of the compound SO_3 per mole of said urea, the reaction in said first step being carried out in a halohydrocarbon solvent which is inert under the reaction conditions, and the second step of reacting the resulting reaction mixture of said first step at 20° C to 140° C with 1 to 1.5 moles of 96 to 100 percent strength sulfuric acid or sulfuric acid monohydrate per mole of said urea to produce said amidosulfonic acid.

4,117,005

INTER-OXA-13,14-DIHYDRO-9β-PGD$_1$ COMPOUNDS

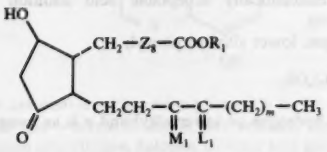
Douglas Ross Morton, Jr., Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,242, Sep. 17, 1975, Pat. No. 4,016,184. This application Dec. 30, 1976, Ser. No. 756,104

Int. Cl.[2] C07C *177/00*

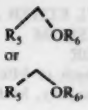
U.S. Cl. 562—503 **25 Claims**

1. A prostaglandin analog of the formula



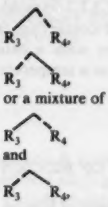
wherein *m* is one to 5, inclusive;

wherein M_1 is



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

wherein L_1 is



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or pharmacologically acceptable cation; and

wherein Z_8 is

(1) $-CH_2-O-CH_2-(CH_2)_g-CH_2$,

(2) $-(CH_2)_2-O-(CH_2)_g-CH_2-$, or

(3) $-(CH_2)_3-O-(CH_2)_g-$,

wherein *g* is one, 2, 3.

4,117,006

SELECTIVE CHLORINATION OF BENZOYL CHLORIDE

Louis Schneider, Elizabeth, and David E. Graham, Westfield, both of N.J., assignors to GAF Corporation, New York, N.Y.

Filed Jun. 14, 1977, Ser. No. 806,378

Int. Cl.[2] C07C *51/58*

U.S. Cl. 260—544 D **1 Claim**

1. A process for the selective chlorination of benzoyl chloride comprising:

(a) chlorinating benzoyl chloride, in the absence of a solvent, and in the presence of a catalyst, to abou: 7–8 mole % unconverted benzoyl chloride, thereby to form a monochlorinated product which is substantially the 3-chlorobenzoyl chloride in high yield, and 2,5-dichlorobenzoyl chloride as a by-product, and

(b) recovering the 3-chlorobenzoyl chloride in essentially pure form and in high yield from the catalyst and 2,5-dichlorobenzoyl chloride present in the reaction product mixture by simple distillation at low temperature and pressure to separate rapidly liquid products from catalyst followed by fractional distillation to separate the 3-benzoyl chloride from 2,5-dichlorobenzoyl chloride.

4,117,007
ERADICATION OF BIS-CHLOROMETHYL ETHER AND 1,1,1,2-TETRACHLOROETHANE FROM CHLOROACETYL CHLORIDE

Robert A. Bredeweg, and Yog R. Dhingra, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 17, 1977, Ser. No. 842,831
Int. Cl.² C07C *51/42*
U.S. Cl. 260—544 Y **8 Claims**

1. A process of eradicating bis-chloromethyl ether and 1,1,1,2-tetrachloroethane from a mixture comprising chloroacetyl chloride, bis-chloromethyl ether and 1,1,1,2-tetrachloroethane, the process consisting essentially of contacting, in the absence of hydrochloric acid, the mixture with a catalytic amount of ferric and/or aluminum cations at a temperature of at least about 50° C.

4,117,008
PROCESS FOR THE PRODUCTION OF BENZOYL CYANIDE (II)

Herbert Klenk, and Heribert Offermanns, both of Hanau, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

Filed Jun. 2, 1977, Ser. No. 802,945
Claims priority, application Fed. Rep. of Germany, Sep. 20, 1976, 2642199
Int. Cl.² C07C *63/06*
U.S. Cl. 260—545 R **19 Claims**

1. A process for the production of benzoyl cyanide comprising reacting benzoic anhydride with an alkali metal cyanide in an inert organic solvent selected from ethers, esters, hydrocarbons, halogenated hydrocarbons and mixtures thereof.

4,117,009
METHOD OF MAKING N-[4-CHLOROPHENYL)AMINO]CARBONYL)-2,6-DIFLUOROBENZAMIDE

Louis Schneider, Elizabeth, and David E. Graham, Westfield, both of N.J., assignors to GAF Corporation, New York, N.Y.

Filed Jun. 9, 1977, Ser. No. 805,129
Int. Cl.² C07C *127/22*
U.S. Cl. 260—553 E **4 Claims**

1. A process for the preparation of N-{[(4-chlorophenyl) amino] carbonyl}-2,6-difluorobenzamide from 2,6-difluorobenzamide which is formed by treating the corresponding nitrile with concentrated sulfuric acid solution, which comprises:

(a) extracting said 2,6-difluorobenzamide from said solution with a solvent which is water-insoluble and acid-stable, which has a boiling point of at least 120° C., wherein said solvent is a straight chain or branched polyhalogenated hydrocarbon having 2–10 carbon atoms, and from which said final product may be crystallized,

(b) condensing said extract with p-chlorophenyl isocyanate at a temperature of at least 120° C. to form said desired product, and,

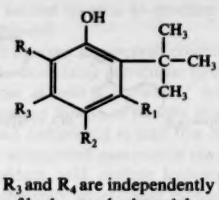
(c) crystallizing said product from the solvent.

4,117,010
THIOLCARBAMATE SULFOXIDES STABILIZED WITH HINDERED PHENOLS

Don R. Baker, Orinda, and Francis H. Walker, Mill Valley, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Sep. 8, 1976, Ser. No. 721,247
Int. Cl.² C07C *147/14*; A01N *9/14*; C07C *155/02*
U.S. Cl. 260—561 S **23 Claims**

1. A composition comprising a herbicidal thiolcarbamate sulfoxide and a stabilizing amount of a hindered phenol of the formula



wherein R_1, R_2, R_3 and R_4 are independently selected from the group consisting of hydrogen, hydroxyl, lower alkyl and lower alkoxy.

4,117,011
ADDITIVES

Robert E. Malec, Birmingham, Mich., assignor to Ethyl Corporation, Richmond, Va.

Filed May 6, 1974, Ser. No. 467,051
Int. Cl.² C07C *87/28*
U.S. Cl. 260—570.5 P **14 Claims**

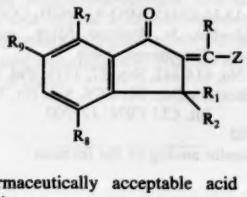
1. A dispersant-detergent composition made by the process comprising reacting (a) one mole part of a polyolefin hydrocarbon-substituted phenol wherein said polyolefin hydrocarbon substitutent has an average molecular weight of from about 650 to 5000, (b) from about 1 to 10 mole parts of a C_{1-4} aldehyde, (c) from about 0.1 to 10 mole parts of an alkylene polyamine having the formula $H_2N(R_1—NH)_nH$ wherein n is an integer from 1 to about 6 and R_1 is a divalent hydrocarbon group containing 2 to about 4 carbon atoms, and (d) from about 0.1 to 50 mole parts of an aklylene oxide containing from 2 to about 6 carbon atoms.

4,117,012
2-AMINOMETHYLENEINDANONE ANALGESIC AGENTS

Philip D. Hammen, East Lyme, and George M. Milne, Jr., Waterford, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 763,241, Jan. 27, 1977, Pat. No. 4,064,272, which is a division of Ser. No. 312,693, Dec. 6, 1972, Pat. No. 4,022,836. This application Sep. 1, 1977, Ser. No. 829,818
Int. Cl.² C07C *27/29*
U.S. Cl. 260—570.8 R **3 Claims**

1. A compound of the formula



and the pharmaceutically acceptable acid addition salts thereof, wherein

R is hydrogen, lower alkyl or phenyl;

Z is

$$—NH(CH_2)_nOR_3$$

wherein R_3 is hydrogen or lower alkyl and n is an integer of from 1 to 5;

R_1 and R_2 are each hydrogen or lower alkyl;

R_7 and R_8 are each hydrogen, fluoro or chloro; and

R_9 is hydrogen or fluoro.

4,117,013

CATALYSTS FOR THE AMMONOLYSIS OF PENTAERYTHRITYL TETRACHLORIDE

William S. Anderson, Sunnyvale, Calif., assignor to United Technologies Corporation, Hartford, Conn.

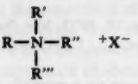
Continuation-in-part of Ser. No. 698,580, Jun. 23, 1976, abandoned. This application Jun. 13, 1977, Ser. No. 806,049

Int. Cl.[2] **C07C** *85/04*

U.S. Cl. 260—585 A **23 Claims**

1. In a process for converting pentaerythrityl tetrachloride to pentaerythrityl tetramine by ammonolysis in methanolic ammonia, the improvement which comprises adding to the reaction mixture a catalytic amount of a material selected from the group consisting of:

(a) amine acid addition salts and quaternary ammonium halides and hydroxides, having the formula

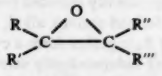


wherein R, R′ and R″ are selected from the group consisting of hydrogen and alkyl groups containing 1–18 carbon atoms, R‴ is selected from the group consising of alkyl, hydroxyalkyl, aryl and aralkyl groups containing 1–18 carbon atoms and X is selected from the group consisting of halogen and hydroxide radicals;

(b) tertiary amines having the formula

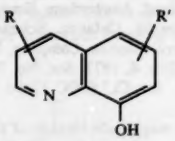
wherein R, R′ and R″ are alkyl, aryl, hydroxyalkyl and aralkyl groups containing from 1–18 carbon atoms, which tertiary amines are converted to the corresponding quaternary ammonium halide in the ammonolysis process;

(c) olefin epoxides having the formula



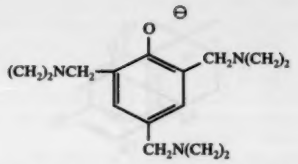
wherein R, R′, R″ and R‴ are selected from the group consisting of hydrogen, alkyl and aryl groups having from 1–18 carbon atoms and which epoxides react with ammonia or amines in the ammonolysis process;

(d) heterocyclic amines having the formula



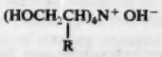
which are converted to amine phenoxide in the ammonolysis process and wherein R and R′ are selected from the group consisting of hydrogen, halogen, sulfonic acid and alkyl groups containing from 1–18 carbon atoms, and the metal and acid salts thereof;

(e) salts of an amine phenoxide of the formula



wherein R, R′ and R″ are hydrogen or alkyl groups containing from 1–18 carbon atoms:

(f) quaternary hydroxyalkyl ammonium hydroxides having the formula



wherein R is selected from the group consisting of hydrogen and alkyl groups having from 1–6 carbon atoms; and

(g) glycidyl halides and ethers having 1–18 carbon atoms.

4,117,014

PROSTAGLANDIN DERIVATIVES

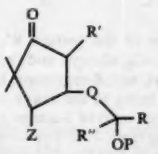
André G. Pernet, Kirkland, Canada; Hiromasa Nakamoto, Awara, and Naoyasu Ishizuka, Ou, both of Japan, assignors to Abbott Laboratories, North Chicago, Ill.

Continuation-in-part of Ser. No. 647,822, Jan. 9, 1976, abandoned. This application Dec. 23, 1976, Ser. No. 753,115

Int. Cl.[2] **C07C** *49/28, 49/46;* **C07D** *309/06*

U.S. Cl. 260—586 R **16 Claims**

1. A compound of the formula



wherein Z is H or CH_3, OP or CH_2OP; P is H or a protective group that can easily be removed without affecting the rest of the molecule; R′ is H; Q is $—CH_2—CH_2—$ or $—CH{=}CH—$;; R is a linear, branched or cyclic alkyl of 3 to 7 carbons, trifluoromethylbutyl, hydroxyalkyl or $—CH_2R'''$ where R‴ is phenyl, cyclopentyl, phenoxy, chlorophenoxy, propoxy or $—CH_2SCH_2CH_3$; and R″ is H or CH_3.

4,117,015

1-ACETYL-3-3-DIMETHYL-(2-PROPENYL)CYCLOHEXANE, PROCESS FOR PRODUCING SAME AND ORGANOLEPTIC USES OF SAME

John B. Hall, Rumson; Mark A. Sprecker, Sea Bright; Frederick Louis Schmitt, Holmdel, and Manfred Hugo Vock, Locust, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

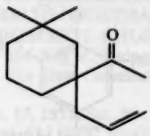
Division of Ser. No. 713,429, Aug. 11, 1976, Pat. No. 4,021,488. This application Feb. 4, 1977, Ser. No. 765,867

The portion of the term of this patent subsequent to Sep. 6, 1994, has been disclaimed.

Int. Cl.[2] **C07C** *45/00*

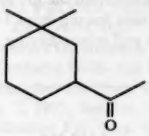
U.S. Cl. 260—586 C **1 Claim**

1. A process for preparing 1-acetyl-3,3-dimethyl-(2-propenyl)cyclohexane having the structure:

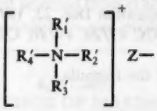


comprising the step of intimately admixing an allyl halide having the structure:

with 1-acetyl-3,3-dimethylcyclohexane having the structure:



in the presence of an alkali metal hydroxide, an inert solvent and a "phase transfer agent," said phase transfer agent having the structure:



wherein at least one of the groups R'_1, R'_2, R'_3 and R'_4 is C_6–C_{14} alkaryl or C_6–C_{20} alkenyl, and the other of R'_1,R'_2, R'_3 and R'_4 is C_1–C_8 alkyl, and Z represents halogen, the temperature of the reaction being in the range of from about 0 up to about 150° C, the mole ratio of 1-acetyl-3,3-dimethylcyclohexane: allyl halide being from 0.5:1.5 up to about 1.5:0.5, the mole ratio of alkali metal hydroxide:allyl halide being from about 0.75:1 up to about 1.5:1, and the concentration of "phase transfer agent" in grams per mole of 1-acetyl-3,3-dimethylcyclohexane being from 0.5 up to 25.

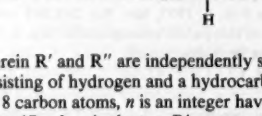
4,117,016

PROCESS FOR STRUCTURAL MODIFICATION OF UNSATURATED ALCOHOLS

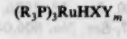
William B. Hughes, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 27, 1977, Ser. No. 801,447
Int. Cl.[2] C07C *45/00, 29/00, 27/00*
U.S. Cl. 260—593 R **10 Claims**

1. A process for the production of a carbonyl compound from an olefinically unsaturated alcohol having from 4 to 20 carbon atoms per molecule and which is represented by the formula



wherein R′ and R″ are independently selected from the group consisting of hydrogen and a hydrocarbyl radical having from 1 to 8 carbon atoms, *n* is an integer having a value in the range of 0 to 17, wherein the two R′ groups can together represent an alkylene radical having from 1 to 16 carbon atoms, which comprises contacting said olefinically unsaturated alcohol under reaction conditions with a catalytic amount of a catalyst composition comprising a ruthenium II hydride complex of a tertiary phosphine ligand which is represented by the formula



wherein each R is a hydrocarbon radical having from 1 to 10 carbon atoms, X is hydrogen or a halogen selected from the group consisting of chlorine, bromine and iodine, Y is selected from the group consisting of CO and PR_3, and *m* is an integer having a value of 0 or 1.

4,117,017

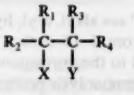
PROCESS FOR PREPARATION OF THIOLS USING A BENZOPINACOL INITIATOR

Charles Robert Morgan, Brookeville, and Richard Wayne Bush, Columbia, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Apr. 18, 1977, Ser. No. 788,161
Int. Cl.[2] C07C *149/00*
U.S. Cl. 260—609 R **3 Claims**

1. The process of forming a primary thiol which comprises reacting at a temperature in the range 50°–150° C an ethylenically unsaturated compound, said unsaturation being in the terminal or pendant position or a combination thereof, with a thiolcarboxylic acid of the general formula:

wherein R is phenyl or an alkyl radical containing 1–6 carbon atoms in the presence of 0.01–5% by weight of the ethylenically unsaturated compound and the thiolcarboxylic acid, of an initiator comprising a pinacol of the general formula:



wherein R_1 and R_3 are aromatic radicals of the structure $-C_6H_4Z$, where Z is independently selected from the group consisting of H, Cl, Br, I, alkyl, aryl, and alkoxy; and R_2 and R_4 are members independently selected from the group consisting of R_1 and R_3 (as defined above), alkyl, aralkyl, alkoxyalkyl, haloalkyl and R_2 and R_4 together form a cycloalkyl group; and X and Y are members independently selected from the group consisting of hydroxyl, alkoxy and aryloxy to obtain a thiol ester and, thereafter, hydrolyzing said thiol ester with an alkali metal hydroxide to obtain the corresponding primary thiol.

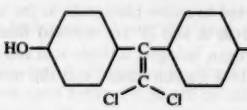
4,117,018

METHOD FOR DEHYDROCHLORINATING 1,1,1,-TRICHLORO-2,2-BIS(4-HYDROXYPHENYL)ETHANE AND PRODUCTS OBTAINED THEREFROM

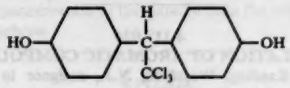
William K. S. Cleveland, Amsterdam; Jimmy L. Webb, Ballston Lake, and Charles M. Orlando, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 4, 1977, Ser. No. 765,654
Int. Cl.[2] C07C *37/00*
U.S. Cl. 568—726 **5 Claims**

1. A method for making dichloride of the formula,



by dehydrochlorinating a trichloride of the formula,



which comprises,

(A) refluxing a mixture containing as essential ingredients,
  (a) the trichloride,
  (b) a dipolar aprotic solvent
  (c) a lithium halide,
  where there is used, per 100 parts by weight of (b), from 5 to 100 parts of (a) and .5 to 10 parts of (c),
(B) adding water the the mixture of (A) at a temperature of from 120° to 70° C to produce a mixture having from 100 to 150 parts of water, per 100 parts of dipolar aprotic solvent and effect the separation of dichloride,
(C) recovering the dichloride from the mixture of (B),
(D) adding water to a dipolar aprotic solvent solution of the dichloride at a temperature of about 90° C and thereafter allowing the mixture to cool slowly to effect the crystallization of the dichloride and
(E) recovering the dichloride from the mixture of (D).

4,117,019

MANUFACTURE OF O-BENZYLTOLUENES

Heinz Eilingsfeld, Frankenthal; Manfred Patsch; Karl-Gerhard Baur, both of Ludwigshafen, and Wolfgang Ruehenbeck, Weinheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

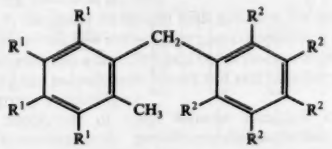
Filed Feb. 14, 1975, Ser. No. 549,910

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1974, 2408529; Jun. 11, 1974, 2428197; Jun. 18, 1974, 2429194; Nov. 30, 1974, 2456747

Int. Cl.[2] **C07C** *25/18, 15/16*

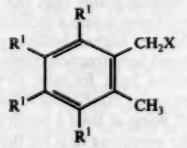
U.S. Cl. 260—649 R **13 Claims**

1. In a process for the manufacture of an o-benzyltoluene of the formula



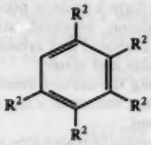
I

in which each R^1 is hydrogen or halogen and each R^2 is hydrogen, halogen, an aliphatic radical or an aromatic radical, by the reaction of an o-xylyl halide with an aromatic compound, the improvement which comprises reacting an o-xylyl halide of the formula



II

in which R^1 has the above meanings and X is halogen, with a benzene of the formula



III

in which R^2 has the above meanings, in a two phase aqueous-/organic reaction medium, wherein the organic phase is finely dispersed in the aqueous phase with droplets of the organic phase being at most 1,000 nanometers in size, and in the presence of sulfuric acid alone as the catalyst in a molar ratio of sulfuric acid to the starting material II of at least 3:1 while using a ratio of from 1 mole up to less than 6 moles of starting material III per mole of starting material II.

4,117,020

METHOD OF PRODUCING VALUABLE ALKYLATED AROMATIC HYDROCARBONS FROM TAR

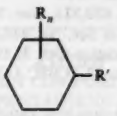
Yun Chung Sun, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 8, 1977, Ser. No. 785,982

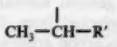
Int. Cl.[2] **C07C** *3/62*

U.S. Cl. 260—668 C **23 Claims**

1. A method of producing valuable alkylated aromatic hydrocarbons of the formula:



wherein R is



each R′ is individually hydrogen or methyl, and *n* is 1 or 2, from a tar obtained from the reaction product of an alkylation process comprising contacting in the presence of an alkylation catalyst and at alkylation parameters:

(a) benzene, toluene or both; with
(b) ethylene, propylene or both,

the tar being substantially free of monoaromatic alkylated material and comprising that fraction of the alkylation reaction product having a distillation temperature of at least about 240° C, the method comprising contacting at a temperature of at least about 240° C and at a pressure of at least about 200 psi:

(i) the tar, with
(ii) benzene, toluene or both; in the presence of a catalytic amount of
(iii) a crystalline aluminosilicate molecular sieve catalyst.

4,117,021

PROCESS FOR REMOVING ORGANIC OXYGEN-CONTAINING IMPURITIES FROM AN ORGANIC COMPOSITION

Stephen S. Hupp, Reserve Township, Allegheny County; Edward T. Sabourin, Allison Park; Harold E. Swift, Gibsonia, and Roger F. Vogel, Butler, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed May 27, 1977, Ser. No. 801,050

Int. Cl.[2] **C07C** *15/00*

U.S. Cl. 260—669 A **8 Claims**

1. The process for producing styrene from ethylene and toluene which comprises

(a) dehydrocoupling toluene in the presence of a solid oxide

oxidant at a first temperature of between about 500° C. and about 700° C. to form a gaseous product stream comprising toluene, benzene, bibenzyl, stilbene, a minute amount of aromatic carbonyl and aromatic hydroxyl impurities, carbon dioxide and water,

(b) substantially reducing the carbon dioxide and the water in said gaseous product stream to a maximum water content of about 1 percent,

(c) purifying said substantially water-free product stream at a second temperature between about 150° C. and about 700° C. by contact with a catalyst comprising an oxide of titanium, iron, nickel, a Group IIb, Vb, VIb or VIIb metal, or a mixture thereof on a support to reduce the aromatic carbonyl and aromatic hydroxyl impurities to a maximum carbonyl content of 50 ppm.,

(d) removing a substantial amount of water from the purified product stream,

(e) contacting the substantially water-free and impurity-free reaction product comprising toluene, benzene, stilbene and bibenzyl with ethylene in the presence of a disproportionation catalyst at a temperature between about 150° C. and about 650° C. whereby stilbene and ethylene react to form styrene, and

(f) separating styrene from the reaction product.

4,117,022

NICKEL BIS-DIORGANO-ORTHOPHOSPHATES THEIR PREPARATION AND USE

Jeffrey G. Meyer, Adrian, Mich., assignor to Anderson Development Company, Adrian, Mich.

Division of Ser. No. 630,323, Nov. 10, 1975, which is a continuation-in-part of Ser. No. 416,390, Nov. 16, 1973, abandoned. This application Oct. 3, 1977, Ser. No. 839,117

Int. Cl.[2] C07C *3/21*

U.S. Cl. 260—669 P **8 Claims**

1. A method of olefin oligomerization consisting essentially of

(1) mixing a combination catalyst consisting essentially of the reaction product of (A) a nickel bis-diorgano-orthophosphate of the general formula $Ni[OP(O)(OR)_2]_2$ in which each R is selected from the group consisting of non-aromatic hydrocarbon groups free of aliphatic unsaturation and containing one to eight carbon atoms, non-aromatic hydrocarbon ether groups free of aliphatic unsaturation and containing three to six carbon atoms, and chlorinated and brominated derivatives thereof and (B) an alkyl aluminum halide of the general formula $R'_cAL\ X_d$ in which each R′ is an alkyl group of one to six carbon atoms, each X is a halogen atom, each of *c* and *d* is 1 or 2 and the total of *c* and *d* is 3, the mol ratio of (A) to (B) ranging from 1:1 to 1:20, with (D) an olefinic hydrocarbon containing no more than about 8 carbon atoms, the mol ratio of total catalyst to component (D) ranging from 0.0001:1 to 0.01:1, at a temperature and pressure and for a time sufficient to cause reaction of (D); and

(2) separately the resulting products.

4,117,023

METHOD OF SEPARATION OF CATALYTIC RESIDUES DERIVED FROM ALUMINUM CHLORIDE

Philippe Jean Gillet, Creutzwald, and Gaston Henrich, Saint-Avold, both of France, assignors to Societe Chimique des Charbonnages, Courbevoie, France

Filed Nov. 12, 1976, Ser. No. 741,488

Claims priority, application France, Nov. 13, 1975, 75 34703; Nov. 13, 1975, 75 34704

Int. Cl.[2] C07C *3/56, 7/00*

U.S. Cl. 260—671 R **9 Claims**

1. In a method of alkylation of an aromatic hydrocarbon by an olefin hydrocarbon in the presence of aluminum chloride followed by neutralization of the acid alkylates by anhydrous ammonia, the improvement comprising continuously flocculating in the absence of free water the mineral salts obtained by said neutralization by the addition of steam, and separating-out the salts thus flocculated.

4,117,024

ETHYLATION OF AROMATIC COMPOUNDS

Warren W. Kaeding, Westfield, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 29, 1977, Ser. No. 820,051

Int. Cl.[2] C07C *3/52*

U.S. Cl. 260—671 R **14 Claims**

1. Process for the ethylation of mono alkyl benzenes wherein the alkyl substituent contains 1 or 2 carbon atoms which comprises contacting the same with ethylene in the presence of hydrogen under conversion conditions including a temperature between about 350° and about 500° C., a pressure greater than atmospheric but less than 400 psig, employing a hydrogen to ethylene mole ratio in the approximate range of 0.5 1 to 10 and in the presence of a catalyst comprising a crystalline aluminosilicate zeolite, which zeolite is characterized by an activity in terms of alpha value, of between about 2 and about 5000, a xylene sorption capacity greater than 1 gram/100 grams of zeolite and an ortho xylene sorption time for 30 percent of said capacity of greater than 10 minutes, said sorption capacity and sorption time being measured at 120° C. and a xylene pressure of 4.5 ± 0.8 mm. of mercury, said crystalline aluminosilicate zeolite further being characterized by a silica to alumina ratio of at least about 12 and a constraint index within the approximate range of 1 to 12, whereby aging of said catalyst during said ethylation is substantially reduced over comparable reaction carried out in the absence of hydrogen.

4,117,025

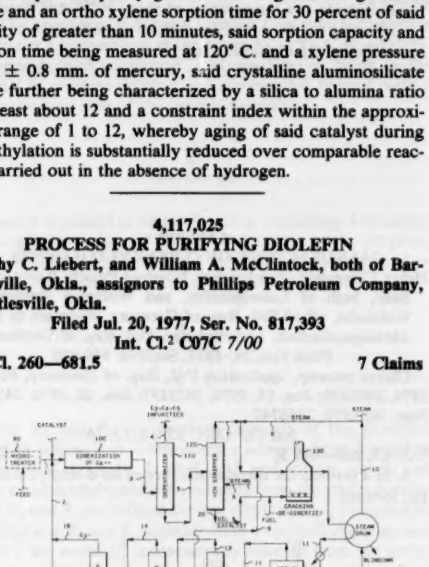
PROCESS FOR PURIFYING DIOLEFIN

Timothy C. Liebert, and William A. McClintock, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 20, 1977, Ser. No. 817,393

Int. Cl.[2] C07C *7/00*

U.S. Cl. 260—681.5 **7 Claims**



1. A process for the separation of a diolefin from a mixture of hydrocarbons having boiling points close to that of the diolefin comprising subjecting the hydrocarbon mixture to conditions which will dimerize the diolefin, separating the effluent of the dimerization into a first heavy fraction comprising diolefin dimer and materials of higher boiling point than the diolefin dimer and a first light fraction comprising hydrocarbons having lower boiling points than the diolefin dimer, separating the first heavy fraction into a second heavy fraction comprising materials having higher boiling points than the diolefin dimer and a second light fraction comprising a diolefin dimer, passing the second light fraction along with steam through a cracking zone under conditions sufficient to de-dimerize the diolefin dimer, using at least a portion of the second heavy fraction as fuel for supplying heat for the cracking zone, cooling the effluent from the cracking zone to recover a water phase, separating the water phase from the hydrocarbon phase, converting at least a portion of the separated water into steam,

directing the steam into and through the cracking zone, and subjecting at least a portion of the hydrocarbon phase to distillation so that a hydrocarbon composition is isolated which has a greater concentration of the diolefin than the original mixture of hydrocarbons.

4,117,026

SELECTIVE PRODUCTION OF PARA DIALKYL SUBSTITUTED BENZENES

Werner O. Haag, Lawrenceville, and David H. Olson, Pennington, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 685,869, May 12, 1976, abandoned, and Ser. No. 685,872, May 12, 1976, abandoned.
This application Oct. 11, 1977, Ser. No. 841,073
Int. Cl.[2] C07C *3/52, 3/62*
U.S. Cl. 260—671 R **25 Claims**

1. A process for the selective production of para dialkyl substituted benzenes wherein the alkyl group contains from 1 to 4 carbon atoms which comprises contacting, under conversion conditions, a hydrocarbon precursor selected from the group consisting of mono alkyl-substituted benzenes having 1-4 carbon atoms in the alkyl substituent, C_2–C_{15} olefin and C_3–C_{60} paraffin or mixtures thereof including mixtures of benzene with at least one of the aforementioned olefins or paraffins with a catalyst characterized by a xylene sorption capacity greater than 1 gram/100 grams of zeolite and an ortho xylene sorption time for 30 percent of said capacity of greater than 10 minutes, said sorption capacity and sorption time being measured at 120° C. and a xylene pressure of 4.5 ± 0.8 mm. of mercury, said catalyst comprising a crystalline aluminosilicate zeolite having a silica to alumina ratio of at least about 12 and a constraint index within the approximate range of 1 to 12 and separating a para dialkyl substituted benzene from the resulting product.

4,117,027

THERMALLY STABLE HOT-MELT ADHESIVE COMPOSITION CONTAINING POLYCARBONATE-POLYDIMETHYLSILOXANE BLOCK COPOLYMER

Edward F. Johnson, Sunnyvale, and John S. Carlsen, Davis, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 560,615, Mar. 21, 1975, abandoned. This application Apr. 16, 1976, Ser. No. 677,528
Int. Cl.[2] C08L *43/04, 83/06, 83/10*
U.S. Cl. 260—824 R **10 Claims**

1. A thermally stable hot melt adhesive for bonding to substrates having low surface energies comprising a silicone block copolymer and a tackifier, said copolymer comprising polycarbonate and polysiloxane blocks and said tackifier selected from the group consisting of

a copolymer of vinyl toluene α-methyl styrene; hexabromobiphenyl; pentabromodiphenylether; and chlorinated terphenyls.

4,117,028

NON-CURING SILICONE PRESSURE SENSITIVE ADHESIVES

James R. Hahn, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Apr. 21, 1977, Ser. No. 789,398
Int. Cl.[2] C08L *43/04, 83/10*
U.S. Cl. 260—825 **4 Claims**

1. A composition suitable for use as a pressure sensitive adhesive consisting essentially of

(1) from 30 to 70 percent by weight of a block copolymer consisting essentially of BAB or $(ABA)_n$ types where n is an integer of 2 or greater, A is a polydimethylsiloxane block having at least 15 siloxane units, B is a polystyrenic block having at least 15 styrenic units per block, the percent by weight B being from 5 to 25 percent of the total weight of A and B and

(2) from 30 to 70 percent by weight based on the weight of (1) and (2) of a benzene soluble copolymer of SiO_2 units and $Me_3SiO_{.5}$ units in which the mol ratio of $Me_3SiO_{.5}$ units to SiO_2 units is from about 0.6:1 to 0.9:1.

4,117,029

HALOGEN-CONTAINING RESIN COMPOSITION CONTAINING ORGANIC SUBSTANCE AS STABILIZER

Yoshikazu Kitano, Takatsuki, Japan, assignor to Nitto Kasei Co. Ltd., Osaka, Japan

Filed Oct. 1, 1974, Ser. No. 510,920
Claims priority, application Japan, Oct. 11, 1973, 48-115142; Oct. 19, 1973, 48-118363; Nov. 9, 1973, 48-126592
Int. Cl.[2] C08L *63/00*
U.S. Cl. 260—836 **10 Claims**

1. A vinyl chloride-containing resin composition stable to heat and light consisting of (a) 100 parts by weight of vinyl chloride resin containing at least 87% by weight of vinyl chloride units, (b) from 0.1 to 10 parts by weight of a heterocyclic glycidyl compound containing a 5- or 6-membered heterocyclic ring with 2 or 3 nitrogen atoms to which at least 2 glycidyl groups are directly bonded, and optionally (c) from 0.01 to 10 parts by weight of a conventional stabilizer selected from one of the group consisting of organic nitrogen compounds, organic sulfur compounds, epoxy compounds, phenolic compounds, dicarboxylic acid monoesters, organotin compounds, metallic soap compounds, lead compounds, and polyhydric alcohols.

4,117,030

VINYL ESTER RESIN COMPOSITIONS CONTAINING DICYCLOPENTADIENE ALKENOATE

Donald Louis Nelson, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

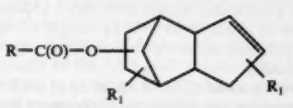
Filed Jul. 11, 1977, Ser. No. 814,358
Int. Cl.[2] C08L *63/00*
U.S. Cl. 260—837 R **9 Claims**

1. A thermosetting resin composition which comprises

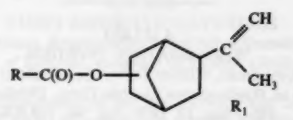
(A) about 80 to about 30% by weight of a vinyl ester resin having terminal unsaturation,

(B) about 20 to about 70% by weight of an unsaturated monomer mixture of a vinyl aromatic monomer and dicyclopentadiene alkenoate concentrate comprising

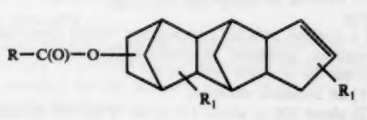
(a) about 50–100% by weight of compounds of the formula



(b) about 0–30% of compounds of the formula



(c) about 0–2% of compounds of the formula



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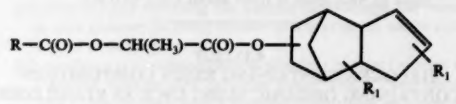
and

(d) about 0–2% of compounds of the formula

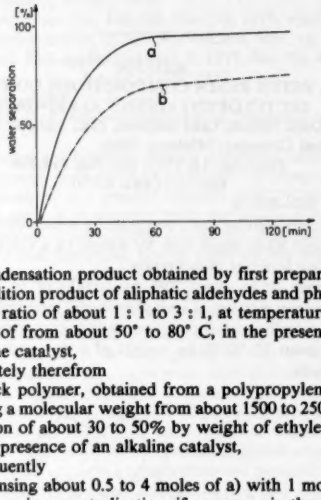


where R is a alkenyl group having 2–4 carbon atoms and R_1 is hydrogen or a methyl group wherein the range of dicyclopentadiene alkenoate concentrate in said mixture ranges from about 5 to about 90 weight percent.

4,117,031
CRUDE OIL DEMULSIFIERS

Johannes Macenka, Burgkirchen, Alz; Manfred Fischer, Burgkirchen-Holzen, and Fritz Joachim Gohlke, Altotting, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 22, 1975, Ser. No. 615,462
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1974, 2445873
Int. Cl.² C08L 61/06
U.S. Cl. 260—838 **3 Claims**



1. A condensation product obtained by first preparing
a. an addition product of aliphatic aldehydes and phenol in a molar ratio of about 1 : 1 to 3 : 1, at temperatures in the range of from about 50° to 80° C, in the presence of an alkaline catalyst,
and separately therefrom
b. a block polymer, obtained from a polypropylene glycol having a molecular weight from about 1500 to 2500 by the addition of about 30 to 50% by weight of ethylene oxide in the presence of an alkaline catalyst,
and subsequently
c. condensing about 0.5 to 4 moles of a) with 1 mole of b), after previous neutralization, if necessary in the presence of inert solvents, at 80° to 150° C, and removing the reaction water formed.

4,117,032
WIRE COATING POWDER

James R. Kwiecinski, Wilkins Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 23, 1976, Ser. No. 726,036
Int. Cl.² C08L 77/00
U.S. Cl. 260—857 PE **20 Claims**

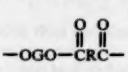
1. A coating prepared by hot melt-mixing, cooling, and grinding
(A) a coating powder composition which comprises a solventless, aromatic polyester-amide-imide which comprises the reaction product of
(1) an aromatic diamine;
(2) about 100 to about 110 mole % (of the stoichiometric amount needed to react with said diamine) of a trimellitic compound selected from the group consisting of trimellitic anhydride, trimellitic acid, trimellitic acid halide, and mixtures thereof; and
(3) about 35 to about 100 mole % in excess of the stoichiometric amount needed to react with said trimellitic compound of a polyol, admixed with
(B) an aromatic straight polyester in a weight ratio of about 9:1 to about 2:1, wherein said aromatic straight polyester is the reaction product of an aromatic straight polyester composition which comprises
(1) about 25 to about 45 mole % of a non-cyclic polyol having 2 to 3 hydroxyals;
(2) about 5 to about 15 mole % tris (2-hydroxy-ethyl-)isocyanurate;
(3) about 40 to about 60 mole % of an aromatic di-acid, di-ester, or di-functional mono-anhydride; and
(4) about 0.1 to about 0.5 mole % of a catalyst; and
(C) a reactive aromatic monomer, pre-polymer, or mixtures thereof in a weight ratio (to said polyester-amide-imide) of about 1:6 to about 1:9.

4,117,033
POLYOXYMETHYLENE/COPOLYETHER-ESTER BLENDS

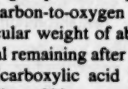
David Mark Gale, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 10, 1976, Ser. No. 749,220
Int. Cl.² C08L 59/02
U.S. Cl. 260—860 **19 Claims**

1. A thermoplastic molding composition comprising a mixture of:
(A) about 99.9–95 percent by weight of an oxymethylene polymer consisting essentially of about 95–100 percent by weight of oxymethylene units and 0 to about 5 percent by weight of oxyalkylene units of 2-8 adjacent carbon atoms in the main chain, said polymer having a number average molecular weight of about 1,000–500,000;
(B) about 0.1–5 percent by weight of a copolyether-ester having an inherent viscosity of about 0.05–0.8, as measured in m-cresol in 0.1 g/dl concentration at 30° C, said copolyether-ester consisting essentially of a multiplicity of recurring intralinear long-chain and short-chain ester units connected head-to-tail through ester linkages, said long-chain ester units having the formula:

(a) 

wherein G is a divalent radical remaining after removal of terminal hydroxyl groups from a poly(alkylene oxide) glycol having a carbon-to-oxygen mole ratio of about 2–4.3 and a molecular weight of about 400–6000; and
R is a divalent radical remaining after removal of carboxyl groups from a dicarboxylic acid having a molecular weight less than about 300;
and said short-chain ester units having the formula:

(b) 

wherein D is a divalent radical remaining after removal of hydroxyl groups from a low molecular weight diol having a molecular weight less than about 250; and
R is as defined above;
with the proviso that the short-chain ester units constitute about 15–75 percent by weight and the long-chain ester units constitute about 85–25 percent by weight of the copolyether-ester.

4,117,034

AMORPHOUS POLYESTER GRAFT POLYMER ALLOYS

William Steffancin, Belpre, Ohio, assignor to Borg-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 603,846, Aug. 11, 1975, abandoned. This application Feb. 18, 1977, Ser. No. 769,988

Int. Cl.[2] C08L 67/06

U.S. Cl. 260—873 7 Claims

1. A thermoplastic alloy composition comprising an amorphous copolyester derived from C_3- C_{10} alkylene glycols and phthalic acids and a synergistically effective amount of a graft polymer prepared by polymerizing from 10 to 60 parts by weight of a monomer mixture of at least two monomers selected from the group consisting of acrylic ester monomers, vinylaromatic monomers and acrylonitrile monomers in the presence of correspondingly from 90 to 40 parts by weight of a diene rubber whereby the thermoplastic alloy composition exhibits synergistically enhanced impact properties.

4,117,035

BLEND OF THERMOPLASTIC POLYMERS INCLUDING BLOCK RADIAL POLYMERS OF THE BUTADIENE-STYRENE TYPE

Edward Lawrence Hillier; Glen Henry Graham, and Warren Evan Eichelberger, all of Ashland, Ohio, assignors to Abbott Laboratories, North Chicago, Ill.

Division of Ser. No. 607,978, Aug. 26, 1975, Pat. No. 4,048,254. This application Apr. 18, 1977, Ser. No. 788,167

Int. Cl.[2] C08L 51/00, 53/00

U.S. Cl. 260—876 B 21 Claims

1. An unvulcanized radial block copolymer mixture having a high degree of clarity and resealability consisting essentially of (a) from about 10–90% by weight of a butadiene-styrene radial block copolymer having a butadiene content the range of about 15–40% by weight, (b) from about 90–10% by weight of a butadiene-styrene radial block copolymer having a different butadiene-styrene content in the range of about 85–60% by weight and styrene content in the range of about 15–40% by weight and (c) about 5–75% by weight of said radial block copolymer mixture of clear polymeric methacrylate-styrene-butadiene copolymers and mixtures of said clear polymeric material, both said radial block copolymers having an average molecular weight of at least 150,000 as measured by inherent viscosity in toluene.

4,117,036

FUNCTIONAL HIGH POLYMERIC SUBSTANCES HAVING α,β-UNSATURATED CARBOXYLATE GROUP AND THE COMPOSITION THEREFROM

Toshio Honda, Akigawa; Itsuo Tanuma, Tokorozawa; Shoji Tanaka, Higashi-Yamato; Koichi Iwami, Kunitachi; Yukio Fukuura, Kodaira, and Yoshikatsu Suzuki, Higashi-Murayama, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Dec. 1, 1976, Ser. No. 746,556

Claims priority, application Japan, Dec. 1, 1975, 50-143767

Int. Cl.[2] C08F 8/20, 8/30, 8/36, 8/14

U.S. Cl. 260—878 R 18 Claims

1. A high polymer substance having α,β-unsaturated carboxylate group and anaerobic curability and curability under ultraviolet irradiation obtained by reacting (A) a liquid high polymeric substance containing carbon-to-carbon unsaturated double bond or a solution of a high polymeric substance containing carbon-to-carbon unsaturated bond with (B) an α,β-unsaturated carboxylic acid or its derivatives selected from the group consisting of acrylic acid, methacrylic acid, 2-hydroxyethyl acrylate and 2-hydroxyethyl methacrylate in the presence of (C) at least one pseudo-halogen compound selected from the group consisting of alkylhypohalite, halogenated isocyanate, N, N-dihaloalkyl urethane, N,N-dichloroaryl sulfonamide and N-halocarboxylic acid imide, wherein the mole ratio of (A) to (B) is in the range of from 1:0.5 to 1:2.5.

4,117,037

BLOCK COPOLYMER COMPOSITIONS

Glenn R. Himes, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 762,598, Jan. 26, 1977. This application Mar. 30, 1978, Ser. No. 892,010

Int. Cl.[2] C08F 297/04

U.S. Cl. 260—880 B 4 Claims

1. A process for simultaneously forming a block copolymer and an anionic polyarene, which comprises:

(a) polymerizing a monoalkenyl arene in a solvent and in the presence of an organomonolithium initiator to form a living precursor polymer of the arene;

(b) adding less than the stoichiometric amount of terminating agent required to terminate all lithium ions wherein at least a portion of the remaining precursor arene polymer blocks contain living ions; therein forming terminated block polymers of anionic polyarenes;

(c) polymerizing a conjugated diene in the presence of the remaining living precursor arene blocks therein forming a living two block copolymer;

(d) contacting said living two block copolymer with a coupling agent therein forming a coupled block copolymer; and

(e) recovering the coupled block copolymer and the anionic polyarene block polymers.

4,117,038

STORABLE, RAPIDLY HARDENING EPOXY RESIN ADHESIVE

Hans Lehmann, Aesch, and Helmut Zondler, Bottmingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 27, 1977, Ser. No. 864,285

Claims priority, application Switzerland, Jan. 7, 1977, 172/77

Int. Cl.[2] C08L 63/00

U.S. Cl. 260—837 R 5 Claims

1. A storable, rapidly hardening epoxy resin adhesive which comprises

a. a polyglycidyl compound containing on average more than one glycidyl group in the molecule and having a softening temperature between 40° and 90° C,

b. a salt of 1 mole of ethylenediamine, 1 mole of bisphenol A and 2 g of N,N-dimethyl-1,3-diaminopropane,

c. an ABS graft polymer and

d. a copolymer of ethylene, acrylic acid and acrylate having a melting range from 70° to 110° C,

said epoxy resin adhesive comprises, per 1 equivalent of glycidyl groups, 0.5 to 1.5 equivalents of hydrogen atoms bonded to nitrogen of ethylenediamine and of N,N-dimethyl-1,3-diaminopropane, and, per 100 parts of the polyglycidyl compound, 3 to 30 parts by weight of the ABS graft polymer and 3 to 20 parts by weight of the copolymer of ethylene, acrylic acid and acrylate, and is in the form of a fine heterogeneous powder.

4,117,039

LIGHT SENSITIVE MATERIALS

Allen Peter Gates, Knaresborough, and Allan Saunderson, Bradford, both of England, assignors to Vickers Limited, London, England

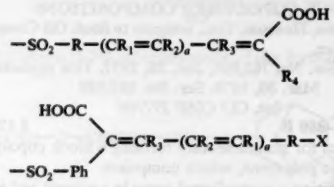
Continuation-in-part of Ser. No. 463,428, Apr. 23, 1974, abandoned. This application Dec. 1, 1975, Ser. No. 636,363

Claims priority, application United Kingdom, Apr. 26, 1973, 19994/73

Int. Cl.[2] C08F 8/34

U.S. Cl. 260—875 8 Claims

1. A light-sensitive material comprising a polymer containing a plurality of primary and/or secondary amino groups and having attached to the nitrogen atoms of the amino groups groups of the formula



(I)

(II)

wherein R represents an aromatic radical; *a* is zero or unity; R_1, R_2 and R_3, which may be the same or different each represents a hydrogen atom, a halogen atom, a cyano group, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an aralkyl group or an aralkoxy group; R_4, when *a* is zero, is an alkoxy carbonyl group, a carboxyl group, or a phenyl group substituted with a deactivating group; R_4 when *a* is unity, an alkyl group, an alkoxy carbonyl group, a carboxyl group, a cyano group, a phenyl group substituted with a deactivating group, or a hydrogen atom; Ph is a phenyl group; and X is a deactivating group.

4,117,040

THERMOPLASTIC RESIN BLENDS CONTAINING POLYINDENE OR COUMARONE-INDENE RESIN

George S. Li, Aurora, and Irving Rosen, Warrensville Heights, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Continuation of Ser. No. 644,122, Dec. 24, 1975, Pat. No. 4,066,717. This application Jul. 18, 1977, Ser. No. 816,245
Int. Cl.² C08L 27/06
U.S. Cl. 260—899 1 Claim

1. A composition having improved physical properties comprising a blend of (A) 100 parts by weight of polyvinyl chloride and (B) from 1 to 50 parts by weight of polyindene resin.

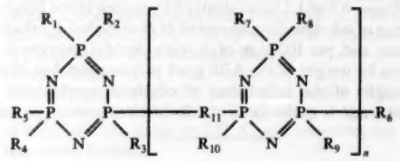
4,117,041

FLAME RETARDANT POLYMERIC COMPOSITIONS

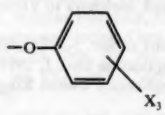
Randolph Joseph Guschl, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 696,278, Jun. 15, 1976. This application Sep. 30, 1977, Ser. No. 838,066
Int. Cl.² C07F 9/15; C08K 5/53
U.S. Cl. 260—927 N 6 Claims

1. A compound of the formula



wherein each of R_1 to R_{10} is a substituent of the formula



where X_3 is hydrogen, bromine and chlorine, and

R_{11} is a linking group derived from bisphenol A, resorcinol, hydroquinone, bisphenol S and p,p'-dihydroxybiphenyl, and

n is the number 1 or greater.

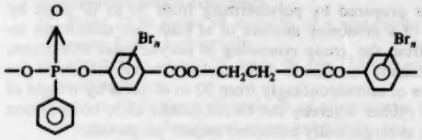
4,117,042

AROMATIC POLYPHENYL PHOSPHONATES

Paul Couchoud, Dardilly, France, assignor to Rhone-Poulenc-Textile, Paris, France

Filed Apr. 26, 1977, Ser. No. 790,997
Claims priority, application France, May 5, 1976, 76 13664
Int. Cl.² C07F 9/40
U.S. Cl. 260—930 1 Claim

1. An aromatic polyphenylphosphonate consisting of recurring units of the formula:



(II)

in which n equals 0 or 2.

4,117,043

PROCESS FOR THE MANUFACTURE OF N-(BETA-DIORGANODITHIOPHOSPHORYLETHYL) ARYL AND ALKYL SULFONAMIDES

Llewellyn W. Fancher, Orinda, and Jeffrey D. Robbins, Berkeley, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Sep. 26, 1977, Ser. No. 836,322
Int. Cl.² C07F 9/165, 9/32, 9/40
U.S. Cl. 260—938 15 Claims

1. A process for the manufacture of a compound having the formula

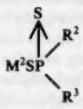
in which R^1 is selected from the group consisting of C_1–C_{10} alkyl, halo-substituted C_1–C_{10} alkyl, phenyl, halo-substituted phenyl, C_1–C_5 alkyl-substituted phenyl, nitro-substituted phenyl, and naphthyl; and R^2 and R^3 are independently selected from the group consisting of C_1–C_{10} alkyl and C_1–C_{10} alkoxy; which comprises

(a) reacting 2-aminoethyl hydrogen sulfate with an aqueous solution of a compound having the formula M^1OH, in which M^1 is selected from the group consisting of lithium, sodium, potassium, ammonium, and tri-substituted ammonium wherein the substituents are independently C_1–C_{10} alkyl, at a M^1OH: (2-aminoethyl hydrogen sulfate) mole ratio of less than or equal to approximately 1.0;

(b) reacting the product of step (a) with approximately an equimolar amount of a compound having the formula R^1SO_2X, in which X is selected from the group consisting of chloride, bromide, or iodide;

(c) reacting the product of step (b) with a further quantity of an aqueous solution of a compound having the formula M^1OH such that the total molar quantity of M^1OH used in this step and step (a) is approximately twice the molar quantity of 2-aminoethyl hydrogen sulfate used in step (a) and the pH is maintained below about 12.5; and

(d) reacting the product of step (c) with a compound having the formula

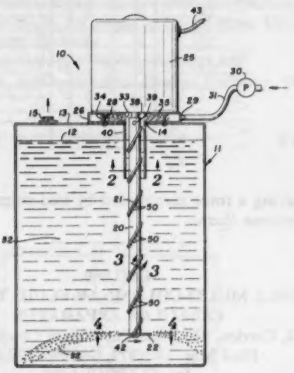


in which M^2 is selected from the group consisting of lithium, sodium, potassium, ammonium, and tri-substituted ammonium wherein the substituents are independently C_1–C_{10} alkyl, at a pH of at least about 9.5.

4,117,044
AERATOR

Stanley J. Durda, 1845 Meadowview Rd., Bloomington, Minn. 55420, and Walter D. Gustafson, 6800 Park Ave. South, Minneapolis, Minn. 55423

Continuation of Ser. No. 668,501, Mar. 19, 1976, abandoned. This application Aug. 1, 1977, Ser. No. 820,547
Int. Cl.² B01F *3/04*
U.S. Cl. 261—30 **14 Claims**

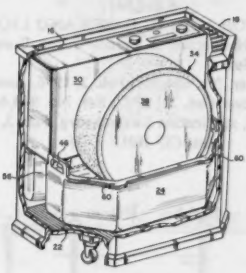


1. An aerator comprising,
a cylindrical member,
a rib member extending around a peripheral surface of said cylindrical member in a number of turns and extending progressively downwardly as it successively passes around the periphery of said cylindrical member, said rib member having a lower wall of a configuration retaining gas bubbles on the under side thereof and said rib member having a radial depth of less than 50 percent of the diameter of said cylindrical member,
means for supporting said aerator with respect to a body of liquid having gas thereabove in such a position vertically that a portion of said rib member extends above the level of the liquid into the gas above the liquid and a substantial portion extends downwardly into direct contact with the liquid with the longitudinal axis of said rib member extending substantially vertically,
a relatively thin diffuser secured adjacent the lower end of said rib and rotatable therewith, said diffuser having an axis extending substantially perpendicular to said rib member axis, and being formed with substantially flat opposed major surfaces so as to eliminate virtually all liquid propelling action when rotated,
and means for rotating said diffuser and said rib member about its longitudinal axis in such a direction that gas bubbles trapped beneath the lower wall of said rib by reason of the portion of the rib extending above the liquid into the gas above move downwardly until they engage the diffuser and are broken up into fine bubbles of a size remaining dispersed in the liquid, said rib member being free of any imperforate enclosure closely surrounding the same for the major portion of its longitudinal extent so that the absence of such an enclosure and the relatively small radial depth of said ribs renders the rotation of said rib member virtually ineffective to cause movement of the liquid.

4,117,045
HUMIDIFIER WITH REMOVABLE WATER RECEPTACLE

Fred G. Henke, West Bend, and Carl R. Spoeth, Jr., Kewaskum, both of Wis., assignors to Dart Industries Inc., Los Angeles, Calif.

Filed Sep. 23, 1976, Ser. No. 725,805
Int. Cl.² B01F *3/04*
U.S. Cl. 261—30 **6 Claims**

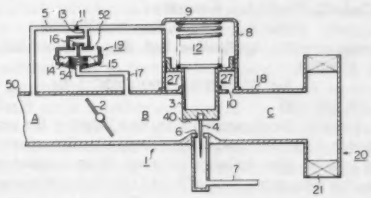


1. A humidifier having an outer housing enclosing a removable power chassis and a removable rotating open-ended drum having a ribbed periphery covered by a peripheral water absorbent material said power chassis containing a power source connected to a fan by drive means, said drum located adjacent said fan whereby air is directed by the fan into said drum and out the periphery thereof through said absorbent material, said housing including interior projection means extending inwardly and a (removable) water reservoir removable from said housing and supported thereby having upstanding sidewalls defining a top opening dimensioned for insertion of a portion of said drum, said sidewalls being indented to cooperatingly engage the projection means for locating the reservoir at a secure predetermined position within the housing beneath said drum, and said sidewalls further including lifting means for removing said reservoir through an opening at the top of said housing.

4,117,046
VARIABLE-VENTURI CARBURETOR

Hidetaka Nohira, Mishima, and Masaaki Tanaca, Susono, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Oct. 28, 1977, Ser. No. 846,460
Claims priority, application Japan, Jul. 7, 1977, 52/80399
Int. Cl.² F02M *9/06*
U.S. Cl. 261—44 C **5 Claims**



1. A carburetor of an internal combustion engine comprising:
a means for varying the sectional area of the intake air passage of the engine;
a pressure source for actuating said varying means;
a working chamber into which pressure is introduced from said pressure source so as to actuate said varying means;

a pipe which connects said pressure source and said working chamber, and;

a diaphragm type pressure control valve, the inlet of said valve being communicated with the atmosphere, the outlet of said valve being connected to said pipe, and the diaphragm chamber of said valve being communicated with the intake pipe of the engine at a portion between the throttle valve and said varying means.

4,117,047

DEVICE FOR MIXING GASES AND LIQUIDS

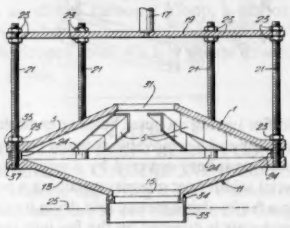
Robert Stephan Hannecart, 2, avenue J.Van Boendaele, 1980 Tervuren, Belgium

Continuation of Ser. No. 654,349, Feb. 2, 1976, abandoned. This application Oct. 21, 1977, Ser. No. 844,406

Claims priority, application Luxembourg, Feb. 3, 1975, 71782

Int. Cl.² B01F *3/04*

U.S. Cl. 261—91 **14 Claims**



1. A device for mixing a liquid with a gas having a liquid level defined therebetween, comprising an upper substantially horizontally extending plate having an upper face, a lower face and a periphery; impeller blades mounted on said upper plate lower face; a central gas intake opening provided in said upper plate; said blades being adapted to suck in gas from said upper plate gas intake opening and to impel it towards the periphery of said upper plate; means for rotating said upper plate; a lower substantially horizontally extending plate having a central liquid sucking aperture and a periphery; said lower plate being coaxial with said upper plate; means for fixedly connecting said upper plate and said lower plate at a distance one from the other, said upper and lower plates thus rotating in unison, a peripheral gap being thus defined between the periphery of said upper and lower plates, said impeller blades being spaced above said gap; and means for supporting said upper and lower plates with said gap being maintained above the liquid level.

4,117,048

APPARATUS FOR INTRODUCING GAS INTO A LIQUID

Josef Stockner, Baierbrunn, and Alfred Wildmoser, Haar b. München, both of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Germany

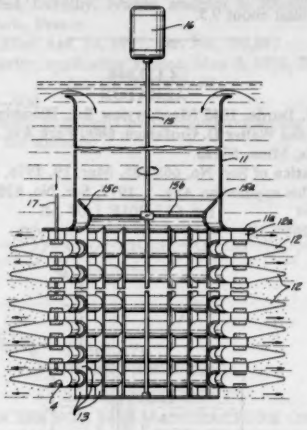
Filed Jul. 2, 1976, Ser. No. 702,052

Claims priority, application Fed. Rep. of Germany, Jul. 4, 1975, 2530050

Int. Cl.² C02D *1/00*; C02C *5/04*

U.S. Cl. 261—93 **2 Claims**

1. A device for dispersing a gas in a liquid in the aeration of sewage in a clarifier tank, comprising a plurality of aerodynamically spaced ribs defining between them venturi passages, means for inducing a flow of liquid through said passages, said passages progressively converging from an upstream side to a constricted portion and thereafter diverging to a downstream side of the respective passage, and gas-permeable means along at least one surface of each of said ribs bounding a respective one of said passages in the region of the respective constriction for feeding gas to the liquid in a direction substantially perpendicular to the direction of liquid flow through the respective passage, a vertical duct in said tank open at its upper end and formed at its lower end with said ribs, said ribs being axially spaced horizontal rings, said means for displacing said liquid through said passages including an axial intake, radial outflow



pump having a rotor surrounded by said rings for displacing liquid between them.

4,117,049

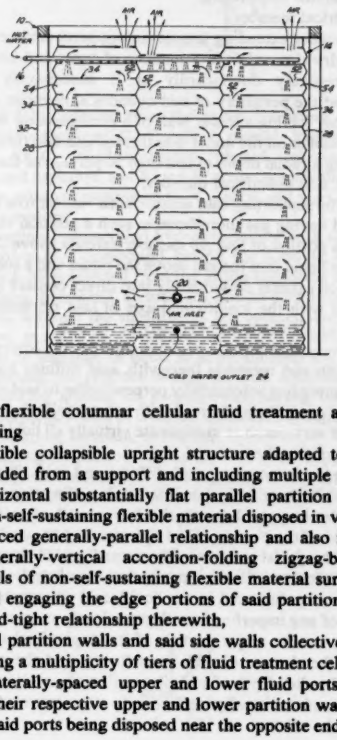
FLEXIBLE MULTI-COLUMNAR FLUID TREATMENT CELLULAR APPARATUS

Arnold J. Carrico, 930 Pinto Ct., Walnut Creek, Calif. 94596

Filed Mar. 14, 1977, Ser. No. 777,567

Int. Cl.² B01F *3/04*

U.S. Cl. 261—111 **6 Claims**



1. A flexible columnar cellular fluid treatment apparatus, comprising

a flexible collapsible upright structure adapted to be suspended from a support and including multiple generally horizontal substantially flat parallel partition walls of non-self-sustaining flexible material disposed in vertically-spaced generally-parallel relationship and also including generally-vertical accordion-folding zigzag-bent side walls of non-self-sustaining flexible material surrounding and engaging the edge portions of said partition walls in fluid-tight relationship therewith,

said partition walls and said side walls collectively defining a multiplicity of tiers of fluid treatment cells having laterally-spaced upper and lower fluid ports through their respective upper and lower partition walls,

said ports being disposed near the opposite ends of their

respective cells in alternating succession defining a zigzag but generally-vertical fluid flow path through said cells of said structure,

and means for respectively admitting and discharging a treating fluid and a treated fluid at vertically-spaced locations in said structure for opposite directions of fluid flow therethrough.

4,117,050
METHOD FOR HEATING AND BLOW MOLDING PLASTER PARISONS

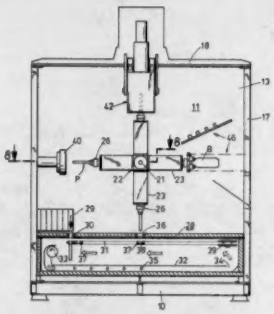
Adolf Appel, Egestorf-Nordheide; Claus Horwege, Hamburg; Wolfgang Reymann, Hamburg, and Otto Rosenkranz, Hamburg, all of Germany, assignors to Gildemeister Corpoplast GmbH, Hamburg, Germany

Filed Oct. 1, 1976, Ser. No. 728,828

Claims priority, application Fed. Rep. of Germany, Oct. 10, 1975, 2545134

Int. Cl.² B29C *17/07*

U.S. Cl. 264—25 **5 Claims**



1. In a method of blow molding an article of a thermoplastic material from a blowable parison, the steps of:

(1) heating the parison uniformly to a temperature less than that at which the parison can be blow molded,

(2) transferring the uniformly heated parison of step (1) into heat transfer proximity to an infra red radiation source,

(3) displacing the parison axially at different speeds past said source to heat the parison to substantially different extents along its axial dimension by radiation from said source, with all blowable portions of the parison being at final blow molding temperature, and

(4) blow molding the parison while at said final blow molding temperature.

4,117,051
CARBON ARTICLE MANUFACTURING METHOD

Toshikatsu Ishikawa, Tokyo; Junichi Tanaka, Yokohama; Yoichiro Tominaga, Sagamihara; Kunio Matsubara, Yokohawa; Yoshihiko Kitazume, Yamanashi, and Tokuji Hayase, Fujisawa, all of Japan, assignors to Nippon Carbon Co., Ltd., Tokyo, Japan

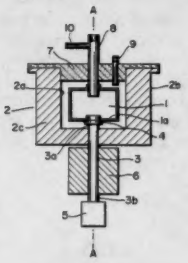
Filed May 26, 1976, Ser. No. 690,302

Claims priority, application Japan, May 30, 1975, 50-64950

Int. Cl.² C01B *31/02, 31/04*

U.S. Cl. 264—29.1 **9 Claims**

1. A carbon article manufacturing method comprising the steps of revolving a rotary hollow member having a carbonaceous material containing a coking material therein at a rotational speed sufficient to mold said material under pressure in the range of 10 to 500 kg/cm² by centrifugal force, and, while revolving the member, gradually baking said member by raising its temperature from room temperature to higher than 400° C., said rotary hollow member having a nonoxidizing atmosphere therein whereby molding and baking said material is simultaneously carried out.



4,117,052
METHOD AND ARRANGEMENT FOR USE IN LINING ARTICLES, PARTICULARLY MELTING OVEN

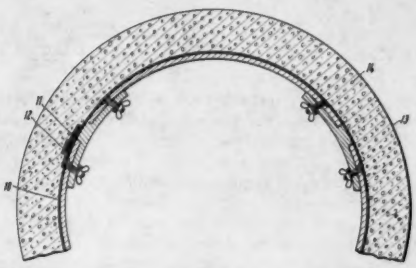
Rudolf Florian, Blomberg, Fed. Rep. of Germany, assignor to Dörentruper Sand- und Thonwerker G.m.b.H., Dorentrup, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 559,865, Mar. 19, 1975, Pat. No. 4,049,759. This application Mar. 28, 1977, Ser. No. 782,307

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1976, 2612912

Int. Cl.² F27D *1/16*

U.S. Cl. 264—30 **7 Claims**



1. A method of lining an article, particularly a melting oven, comprising the steps of providing a mold member with a surface having a configuration substantially corresponding to a face of the article which is to be lined; arranging at said surface a plurality of circumferentially adjacent flexible plate-like elements of a refractory material and connecting said elements with one another so as to form a circumferentially complete refractory member releasably surrounding said mold member; arranging said mold member surrounded by said refractory member, and the article relative to one another so that a space is provided intermediate said refractory member and said face of the article; admitting said lining substance into said space intermediate said refractory member and said face of the article; removing said mold member from said refractory member intact and such a manner that said refractory member remains as a support for said lining substance; rigidifying said lining substance located in said space intermediate said refractory member and said face of the article including sintering of said lining substance after removing said mold member solely by admitting liquid metal into the interior of said refractory member remaining in the melting oven and supporting said lining substance while the melting oven is cold and newly lined so that during sintering said liquid metal supplies heat to and

exerts pressure on said lining substance; and using synthetic mica bonded by synthetic resin material, as the refractory material of said flexible plate-like elements, whereby the synthetic mica bonded by synthetic resin material due to its inherent low heat transmission inherently prevents said lining substance from being subjected to an instantaneous temperature shock and thereby inherently prevents the temperature of said lining substance from increasing to the point causing substantial expansion of the latter until at least after the interior of said refractory member has been filled with said liquid metal to a height sufficient for the metallostatic pressure of the liquid metal to resist such expansion.

4,117,053

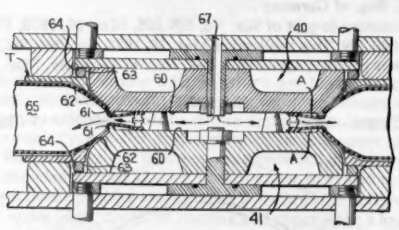
METHOD OF RETREADING A TIRE UTILIZING AN ANNULAR SEALING GAP

Kenneth T. MacMillen, 4992 Wesleyan Woods Dr., Macon, Ga. 31204

Division of Ser. No. 391,816, Aug. 27, 1973, Pat. No. 3,997,284. This application Nov. 5, 1975, Ser. No. 628,902

Int. Cl.[2] B29H *5/04*

U.S. Cl. 264—36 **5 Claims**



1. In a method of retreading a tire wherein the tire is opposing relatively movable matrices in conjunction with an annular bladder having a main annular portion housed within the tire and first and second innermost peripheral marginal portions in overlying relationship upon respective first and second relatively movable opposing head aligner wheels, the matrices are closed, and the bladder is inflated to urge the tire into intimate conformity with the matrices, the improvement comprising the steps of creating prior to closing the matrices a first hermetically sealed annular gap between a terminal edge of the first innermost peripheral marginal portion, an outboard portion of the first innermost peripheral marginal portion and the first bead aligner wheel and a second hermetically sealed annular gap between a terminal edge of the second innermost peripheral marginal portion, an outboard portion of the second innermost peripheral marginal portion and the second bead aligner wheel, to hold the innermost marginal portions against the bead aligner wheels.

4,117,054

METHOD OF COMPENSATING FOR THE ROLL DEFLECTION IN A CALENDER

Esko Salo, Jakobstad, Finland, assignor to Oy Wiik & Höglund Ab, Finland

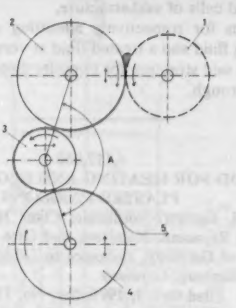
Filed Mar. 23, 1977, Ser. No. 780,425

Claims priority, application Finland, Mar. 30, 1976, 760841

Int. Cl.[2] B29C *15/00;* **B29D** *9/02, 7/14*

U.S. Cl. 264—40.1 **10 Claims**

1. A method for adjusting spacing, across the full width of a calendar stack, between at least rolls defining the last nip of a calendar stack having at least 3 rolls subjected to a common work-pressing load, less than a predetermined maximum value, axes of at least two of said rolls lying in a common plane, said



method comprising: crowning at least one roll of said three rolls to correspond to said maximum work load for said stack; for work loads less than said maximum, correcting for excess crowning of said one roll, by displacing at least one of said rolls forming said nip relative said common plane in such a way as to initially change spacing between the crowned roll and a remaining two of said at least three rolls while maintaining parallel the axes of said at least three rolls, and moving said two rolls toward each other in said plane to compensate for said displacement of said one roll.

4,117,055

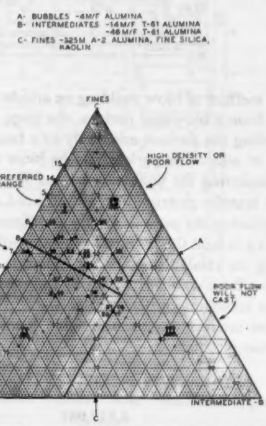
LOW MASS, HIGH ALUMINA-SILICA REFRACTORIES

Walter Howard Alexanderson, Augusta, Ga., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Sep. 20, 1977, Ser. No. 835,073

Int. Cl.[2] B28B *1/08;* **C04B** *35/10, 35/14*

U.S. Cl. 264—56 **3 Claims**



1. A low mass, high alumina-silica refractory mix which upon the addition of a non-phosphate polyelectrolyte deflocculant and from about 11.8 to 16 percent by weight of water is capable of forming a thixotropic casting slip suitable for the production of kiln furniture by vibration casting in a plaster mold, said mix consisting essentially of from 20 percent to 45 percent −4M/F alumina bubbles, from 0 percent to 40 percent −14M/F and −48M/F tabular sintered alumina, and from 35 percent to 80 percent −325M calcined alumina, −200M fine crystalline silica and kaolin, of which 10 percent is silica and 7 percent is kaolin, all percentages expressed on a weight basis.

3. A method of producing a low mass, high alumina-silica product suitable for use as kiln furniture comprising blending a dry mixture consisting essentially of from 20 percent to 45 percent −4M/F alumina bubbles, from 0 percent to 40 percent −14M/F and −48M/F tabular sintered alumina, and from 35

percent to 80 percent −325M calcined alumina, −200M fine crystalline kaolin, of which 10 percent is silica and 7 percent is kaolin, adding a mixture of non-phosphate polyelectrolyte deflocculant and water to the dry mixture, the water being about 11.8 to 16 percent by weight of the dry mixture, and mixing together, placing the resultant thixotropic combination of materials on a plaster mold, vibrating the resultant combination and the plaster mold causing the materials to flow into the mold, stopping the vibration and permitting the materials to become firm, removing the casting from the mold and air-drying, heating and firing the casting.

4,117,056
PRODUCTION OF BETA-ALUMINA CERAMIC ARTICLES

Ivor Wynn Jones, Chester, England, assignor to Chloride Silent Power Limited, London, England

Filed Mar. 9, 1977, Ser. No. 776,024

Claims priority, application United Kingdom, Feb. 7, 1977, 5007/77

Int. Cl.² C04B *35/10*

U.S. Cl. 264—57 **11 Claims**

1. A method of manufacturing a beta-alumina ceramic article comprising the steps of:

(a) compacting finely-divided particles of beta-alumina or a mixture of finely-divided powdered materials which react together, on heating, to form beta-alumina so as to produce a homogeneous green compact, and sintering the green compact to form an impervious polycrystalline ceramic;

(b) isostatically pressurising the sintered body at a temperature above the elastic/plastic transformation and between 1200° C. and 1550° C. at a pressure above 5000 psi;

(c) cooling said body under pressure to a temperature below the elastic/plastic transformation and below 1200° C.; and

(d) then releasing the pressure.

4,117,057
SILICON CARBIDE SINTERED MOLDINGS AND A METHOD FOR PRODUCING THE SAME

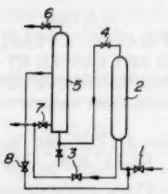
Seishi Yajima; Josaburo Hayashi, and Mamoru Omori, all of Oharai, Japan, assignors to The Research Institute for Iron, Steel and Other Metals of the Tohoku University, Sendai, Japan

Filed Jun. 21, 1976, Ser. No. 698,453

Claims priority, application Japan, Jun. 25, 1975, 50/77567; Sep. 27, 1975, 50/115965

Int. Cl.² C04B *35/26*

U.S. Cl. 264—63 **15 Claims**



1. A method for producing SiC sintered moldings, which comprises mixing SiC powders with 0.3–30% by weight of a binder consisting essentially of organosilicon high molecular weight compounds having silicon and carbon as the main skeleton components, which have been produced through polycondensation reaction of polysilane compounds having Si—Si bond, molding the resulting mixture into a desired shape and heating the molding at a temperature of not higher than 2,200° C. under a non-oxidizing atmosphere to form SiC sintered molding.

4,117,058
METHOD OF MAKING BORON CONTAINING STRONTIUM FERRITE

Adolph L. Michell, Mt. Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 3, 1976, Ser. No. 747,069

Int. Cl.² C04B *35/26, 35/64*

U.S. Cl. 264—65 **3 Claims**

1. An energy-saving method of making a boron-containing strontium ferrite having a magnetoplumbite crystal structure and an empirical formula of about $SrO \cdot 6Fe_2O_3$, comprising the steps of:

forming a mixture of water and ferro-boron, a water-insoluble source of strontium oxide, and magnetite in substantially stoichiometric proportions corresponding to said boron-containing strontium ferrite, said ferro-boron providing a boron content equivalent to about 0.3 to 1.5% by weight boric acid;

concurrently grinding and blending said mixture to form a homogeneous slurry;

mechanically separating at least 50% of said water from said mixture to yield a uniformly blended residue of strontium ferrite reactants that retains stoichiometry, boron content, and uniform boron distribution of said mixture;

heating said residue in an oxidizing atmosphere to remove the balance of said water and to calcine said reactants;

comminuting the calcined residue;

compressing at least a portion of the calcined and comminuted residue to form a briquette; and

sintering the briquette to form a boron-containing strontium ferrite magnet.

4,117,059
METHOD AND APPARATUS FOR THE MANUFACTURE OF CONCRETE PRODUCTS

John A. Murray, Norristown, Pa., assignor to U.S. Terrazzo Panels, Inc., Bryn Mawr, Pa.

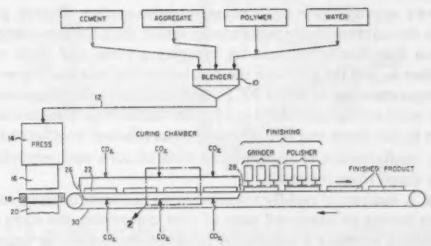
Division of Ser. No. 468,566, May 9, 1974, abandoned, which is a continuation of Ser. No. 317,060, Dec. 20, 1972, abandoned, which is a division of Ser. No. 106,364, Jan. 14, 1971, abandoned.

This application May 19, 1976, Ser. No. 687,922

The portion of the term of this patent subsequent to Jun. 6, 1995, has been disclaimed.

Int. Cl.² C04B *15/14*

U.S. Cl. 264—82 **13 Claims**



1. The method of manufacturing concrete products of a given shape comprising the steps of blending together about 60–75% by weight of an aggregate, about 20–25% by weight of hydraulic cement, about 1–2% by weight of a vinyl acetate-dibutyl maleate copolymer, and about 5–10% by weight of water; compressing said mixture into said given shape in a mold with sufficient pressure to maintain the mixture in said given shape when the mold is removed; curing the compressed shape in an atmosphere consisting essentially of carbon dioxide gas while simultaneously feeding said carbon dioxide gas so as to cause an exothermic temperature rise in the mixture of at least 20°–40° in less than about 5 minutes.

9. The method of manufacturing concrete products compris-

ing the steps of blending together about 60–75% by weight of an aggregate, about 20–25% by weight of hydraulic cement, about 1–2% by weight of a vinyl acetate-dibutyl maleate copolymer, and about 5–10% by weight of water; compressing said mixture into a shape of predetermined height, continuously conveying said compressed shape to and through a chamber, and curing the compressed shape in said chamber with carbon dioxide gas while simultaneously feeding said carbon dioxide gas into said chamber, and maintaining the height of said chamber at about 1¼–4 times the height of said shape.

4,117,060

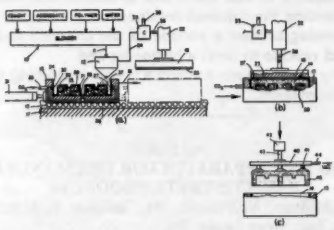
METHOD AND APPARATUS FOR THE MANUFACTURE OF CONCRETE AND LIKE PRODUCTS

John A. Murray, Norristown, Pa., assignor to U.S. Terrazzo Panels, Inc., Bryn Mawr, Pa.

Division of Ser. No. 388,558, Aug. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 336,362, Feb. 27, 1973, abandoned, and a continuation-in-part of Ser. No. 106,364, Jan. 14, 1971, abandoned. This application May 20, 1976, Ser. No. 688,323

Int. Cl.² C04B *15/14*

U.S. Cl. 264—82 **19 Claims**



1. A method of rapidly manufacturing concrete or like products having an advanced state of cure, comprising the steps of blending together of calcareous cementitious binder, aggregate, vinyl acetate-dibutyl maleate copolymer and water in effective quantities, depositing the starting mix into a mold cavity having inner surface portions that are substantially non-metallic, delivering carbon dioxide gas to the mold cavity in sufficient amounts to create a substantial essentially complete carbon dioxide environment in the cavity, molding the mixture to have a predetermined shape determined by the cavity configuration by compressing the carbon dioxide gas and the mixture in the mold cavity under the pressure exerted upon compacting the mix by bringing a press and mold together to seal the gas with the mix before the mix undergoes a temperature rise of about 20° F., and continuing the pressure in the mold cavity until there is a further exothermic temperature rise in the shape and until the shape has reached a self-sustaining configuration in an advanced state of cure, and removing the shape from the mold.

4. A method of rapidly manufacturing concrete or like products having an advanced state of cure comprising the steps of blending together a calcareous cementitious binder, an aggregate, vinyl acetate-dibutyl maleate copolymer and water to form a mix, depositing the starting mix into a mold cavity having inner surfaces that are substantially non-metallic, delivering carbon dioxide gas to the mold cavity in sufficient amounts to create a carbon dioxide environment in the cavity, molding the mixture to a predetermined shape determined by the cavity configuration, whereby the temperature of the mix rises, sealing the gas within the mix before the mix undergoes a temperature rise of about 20° F., continuing the pressure in the mold cavity until there is a further exothermic temperature rise in the shape and until the shape has reached a self-sustaining configuration in an advanced state of cure, and removing the shape from the mold.

4,117,061

METHOD OF MAKING A LAMINATED CONTAINER CONSISTING MAINLY OF THERMOPLASTIC MATERIAL

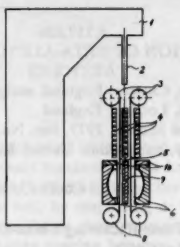
Torben Jørgensø, Vester Alle 5, Strandhuse, DK-6000 Kolding, Denmark

Filed Oct. 26, 1976, Ser. No. 735,202

Claims priority, application Denmark, Oct. 31, 1975, 4928/75

Int. Cl.² B29C *17/04, 17/07*

U.S. Cl. 264—89 **6 Claims**



1. A method of making a layered container consisting mainly of thermoplastic material comprising the steps of

feeding foil material along each side of an intermediary plate forming part of a vacuum mould having two mould halves,

closing each of the two mould halves of said vacuum mould upon the intermediary plate, thereby clamping foil material between each mould half and a corresponding side of the intermediary plate,

cutting blanks from said clamped foil material substantially along the peripheries of said mould halves in contact with said foil material,

applying a vacuum between each blank and the corresponding mould wall so as to shape the blanks in the respective mould halves into outer container elements lying closely against the walls of the mould halves,

removing the intermediary plate from between the mould halves,

closing the mould halves directly upon one another,

forming by blow moulding an inner container element within the mould with the already moulded outer container elements present therein in close contact with the mould wall so as to provide a container composed of said inner and outer elements being in intimate contact with one another, and

removing the container thus formed from the mould.

4,117,062

METHOD FOR MAKING A PLASTIC CONTAINER ADAPTED TO BE GRASPED BY STEEL DRUM CHIME-HANDLING DEVICES

Albert R. Uhlig, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Jun. 17, 1977, Ser. No. 807,704

Int. Cl.² B29C *17/07*

U.S. Cl. 264—94 **2 Claims**

1. A method of forming a plastic container having a reinforced raised circular rim which has at its top a circumferential outwardly radially thickened portion defining a downwardly facing circumferential ledge adapted to be grasped by steel drum chime-handling devices which comprises

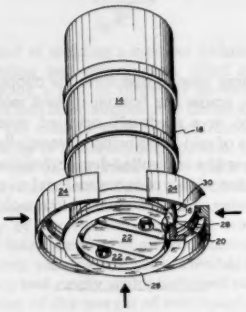
blow molding a generally tubular plastic parison in a blow mold to produce a preform having a bottom end, a top end and a generally circumferential sidewall between said ends, wherein a rounded peripheral shoulder joins said top and said sidewall which first flares outwardly in the form of the frustum of a cone and subsequently flares inwardly in the form of a first inverted frustum of a cone, said

frustum and said first inverted frustum being connected by a circumferential outwardly radially extending rib forming a downwardly facing circumferential ledge meeting the top of said first inverted frustum,

and during and immediately after said blow molding differentially cooling the outer surface of the wall of said preform to form a relatively cool and rigid outer skin while maintaining the material between the wall surfaces of said container at a deformable temperature but maintaining the outer skin and interior of the wall of said shoulder and of said rib at a relatively warmer and more easily deformable temperature,

removing said preform from said mold cavity, and without further blow holding reshaping said preform by the steps of

(1) closing a split ring forming assembly around a portion of said preform to enclose and fit said first inverted frustum and the bottom and sidewall of said rib,



(2) thereafter pressing a circumferential shaping ring against said top end in the direction of said bottom end in an area extending radially inwardly from the juncture of said top end and said shoulder,

(3) continuing said pressing to reshape said preform by bending said preform (i) at the juncture of said frustum and said rib and (ii) at said rounded shoulder until (a) the curve of said rounded shoulder becomes reversed, (b) said frustum is repositioned inside said first inverted frustum and becomes itself a second inverted frustum parallel to and pressed against said first inverted frustum and (c) the top of said rib becomes the peripheral top of the thus reshaped preform,

said reshaping steps (1), (2) and (3) forming a container with an upstanding ring of double-walled thickness having said ledge near its top adapted to be grasped by steel drum chime-handling devices,

and cooling the resulting container to a rigid condition.

4,117,063

PROCESSING A GRAFT POLYMER OR ELASTOMER

Hermann Uwe Voigt; Martin Völker, both of Langenhagen, and Hans Peter Stehmann, Fuhrberg, all of Fed. Rep. of Germany, assignors to Kabel-und Metallwerke Gutehoffnungshutte AG., Hanover, Fed. Rep of Germany

Filed Dec. 22, 1975, Ser. No. 642,764

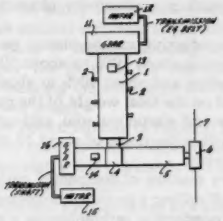
Claims priority, application Fed. Rep. of Germany, Dec. 12, 1974, 2458776

Int. Cl.² C08F *29/12*

U.S. Cl. 264—102 **25 Claims**

1. In a method of continuously making a product of a thermoplastic or elastomeric material which is to cross-link subsequent to shaping the material into said product, wherein the thermoplastic or elastomeric base material and silane or a silane component are provided at a metered relation to the base material for purposes of grafting and ultimate cross-linking; and

the thus provided thermoplastic or elastomeric base material is mixed with the silane or a silane compound at a ratio to permit grafting of the silane or silane compound, resulting in a mixture; the improvement comprising an uninterrupted sequence of the following steps:



mechanically working the resulting mixture at a temperature in excess of 140° C to homogenize the melting mixture while obtaining said grafting;

degassing the still warm, worked, grafted mixture following immediately the working step as flowing from the working; and

immediately after degassing forming the still flowing and degassed mixture into the said product, the product cross-linking subsequently in the presence of moisture.

4,117,064

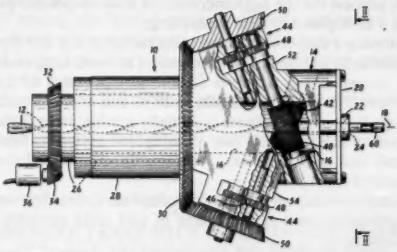
METHOD FOR TWISTING STRIP MATERIAL

George L. Mathe, Bon Air, and Jerome S. Osmalov, Richmond, both of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Division of Ser. No. 492,196, Jul. 26, 1974, abandoned. This application May 5, 1976, Ser. No. 683,393

Int. Cl.² B29F *3/10*

U.S. Cl. 264—103 **2 Claims**



1. A method for shaping a continuous ribbon of thermoplastic stock to impart a helical twist thereto which comprises advancing a continuous thermoplastic tube along a fixed, straight longitudinally directed axis and through the nip between cooperating rotating surfaces of oppositely biased rotating members rotating about fixed axes and disposed in crossing array relative to said advance course to present common strip engaging lengths on said surfaces thereby to flatten said tubing as a continuous ribbon and impart a helical twist to said ribbon without imparting any bodily rotation effect to the ribbon by concurrently bodily rotating said members about the fixed axis of advance of said ribbon to compensate for any rotational effect produced in said ribbon by said members tending to rotate said ribbon bodily about said axis of advance.

4,117,065

METHOD OF FORMING CONDUCTIVE CARBON-PLASTIC MATERIAL

Hsue C. Tsien, Livingston, and Agustin F. Venero, Berkeley Heights, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed May 2, 1977, Ser. No. 792,901
Int. Cl.[2] C04B 35/00
U.S. Cl. 264—105 11 Claims

1. A method of forming a conductive carbon-plastic material having enhanced surface conductivity characteristics, comprising:

(a) molding a conductive carbon-plastic material from a mixture containing about 10% to about 50% particulate conductive carbon and about 90% to about 50% plastic material, based on the total weight of the particulate conductive carbon and plastic material, said carbon having a particle size within the range of about 10 millimicrons to about 100 microns;

(b) forming a dry mixture of compacted carbon and metal particles by ball milling a mixture containing about 5% to about 30% of conductive carbon having a particle size of about 5 millimicrons to about 50 millimicrons and about 95% to about 70% of metal particles having a particle size of about 10 microns to about 200 microns based on the total weight of the carbon and metal particles; and

(c) simultaneously abrading the surface of said conductive carbon-plastic material and embedding carbon particles therein by projecting against said surface said dry mixture of compacted carbon and metal particles at a pressure of at least about 50 psig.

4,117,066

NOVEL PROCESS FOR THE COMPLETE ISOLATION AND RAPID DRYING OF SOLIDS FROM SUSPENSIONS

Hans Mollet, Reinach; Roland Häberli, Würenlingen; Alberto Rabassa, Kleindöttingen, and Fridolin Bäbler, Allschwil, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 575,117, May 6, 1975, abandoned. This application Jan. 31, 1977, Ser. No. 764,111
Claims priority, application Switzerland, May 10, 1974, 6425/74
Int. Cl.[2] B01J 2/06
U.S. Cl. 264—117 5 Claims

1. A process for the agglomeration of solid suspended particles in a multiphase system comprising:

a. forming a suspension of the solid particles in a first liquid;

b. gradually adding to said suspension at room temperature, a second liquid which is soluble to the extent of up to about 20% in the first liquid at 20° C and in which second liquid the solid substance is partially soluble, in an agglomerating amount such that a multiphase system is formed and said solid substance is partially dissolved by said second liquid;

c. simultaneously agitating said multiphase system by intense turbulence until agglomerates of said solid particles are formed;

d. separating said agglomerates from the multiphase system; and

e. drying the separated agglomerates.

4,117,067

HIGH PRODUCTION METHOD OF PRODUCING GLASS FIBER RESIN COMPOSITES AND ARTICLES PRODUCED THEREBY

Kenneth F. Charter, Newark, Ohio; John R. Miller, Scottsburg, Ind., and David W. Garrett, Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Dec. 31, 1975, Ser. No. 645,483
Int. Cl.[2] B29C 5/06
U.S. Cl. 264—119 4 Claims

1. The method of making a glass fiber preform comprising: providing a mold having an enclosed chamber, said enclosed chamber having a vented opening at its upper end, providing a filling tube with its lower end projecting down into the vent opening of said enclosed chamber so that air entering said filling tube changes direction approximately 180° to escape from the mold, directing a stream of chopped glass fibers and air into said filling tube, controlling the amount of air passing

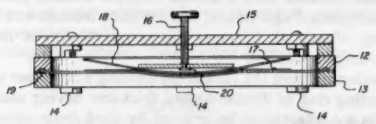
through said filling tube to distribute the chopped fibers in a controlled layer across the bottom of said mold, said fibers being distributed in a randomly oriented manner with the longitudinal axes of said fibers being substantially planar, compressing said layer to a controlled degree, bonding the fibers of said layer together with a resinous material to provide a preform, and removing said preform from the mold.

4,117,068

METHOD FOR FORMING CURVED PLASTIC FILM FROM A FLAT FILM

Charles Newell Miller, Richfield, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Oct. 26, 1976, Ser. No. 735,490
Int. Cl.[2] B29H 21/04
U.S. Cl. 264—130 8 Claims



1. A method of shaping a flat polyester film comprising the workpiece into a predetermined convex contour, comprising:

(a) attaching a flat backing film larger than the film and made of substantially the same material, about its periphery to a frame within which the workpiece film can lie;

(b) laying the workpiece film unclamped on the backing film;

(c) heating the films to above their heat distortion temperature;

(d) while the temperature is maintained, slowly forcing a die having substantially the predetermined contour into the films until the predetermined contour of the films are attained;

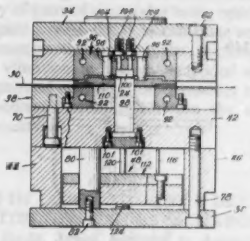
(e) while maintaining the position of the die, cooling the films to substantially below the heat distortion temperature; and then

(f) withdrawing the die from the films.

4,117,069
METHOD OF MOLDING A CASSETTE HALF WITH WINDOW INSERT

John W. Von Holdt, 7430 N. Croname Rd., Niles, Ill. 60648

Division of Ser. No. 683,906, May 6, 1976, Pat. No. 4,061,455.
This application Jun. 8, 1977, Ser. No. 804,824
Int. Cl.[2] B29C 5/00; B29D 3/00; B29F 1/00
U.S. Cl. 264—153 7 Claims

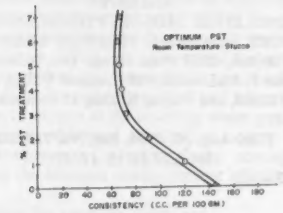


1. The method of molding a member defining a frame, said frame surrounding and retaining an insert member, which comprises: placing a pair of relatively movable mold cavity plate assemblies into an arrangement to define at least one mold cavity having the configuration of said frame-defining member, passing a strip of insert-forming material through a channel defined in one of said mold cavity plate assemblies, and moving a punch transversely through said channel in said mold cavity plate assembly to shear an insert member from said elongated strip of insert-forming material, while causing the margin of said insert member to protrude laterally beyond the end of said punch, moving said insert member into the cavity, thereafter filling said cavity with plasticized material to cause at least a portion of the margin of said insert member to become embedded in said plasticized material, and allowing said plasticized material to harden, whereby said insert member becomes embedded in the molded frame.

4,117,070
PROCESS FOR PREPARING CALCINED GYPSUM

Eugene Edward O'Neill, Okeene, Okla., assignor to United States Gypsum Company, Chicago, Ill.

Filed Mar. 14, 1977, Ser. No. 777,213
Int. Cl.[2] B32B 13/00; B28B 3/00
U.S. Cl. 264—234 11 Claims



1. A continuous process for manufacturing gypsum board characterized by using a reduced amount of water to fluidize calcined gypsum in forming the gypsum slurry which is fed to the board making machinery and therefore requiring less energy to dry the wet board which comprises:

(1) supplying calcined gypsum feed to be conveyed to a gypsum slurry mixer;

(2) diverting a portion of said calcined gypsum to a blender, said portion being at least about 50% by weight of the total calcined gypsum feed;

(3) blending a small amount of water with said calcined gypsum portion in said blender, said water ranging from about 1% to about 8% by weight of the total calcined gypsum feed;

(4) recombining the wetted diverted portion of said calcined gypsum with the dry, undiverted portion to form a homogeneous mixture of calcined gypsum;

(5) allowing the recombined homogeneous mixture of calcined gypsum to heal;

(6) feeding the healed mixture of calcined gypsum to the gypsum slurry mixer;

(7) adding additional water to the healed mixture of calcined gypsum in the slurry mixer, said additional water being added in an amount sufficient to provide from about 65 to about 85 parts of water, including water added in the blender, per 100 parts of the calcined gypsum, which results in reducing the amount of water to be evaporated from the wet board;

(8) mixing the healed mixture of calcined gypsum and water in the slurry mixer to form a homogeneous slurry;

(9) feeding the slurry to a gypsum board making machine to form a wet gypsum board;

(10) passing the wet gypsum board to a kiln to dry the board; and

(11) recovering dry gypsum board consisting essentially of calcium sulfate dihydrate.

7. A continuous process for manufacturing gypsum board characterized by using a reduced amount of water to fluidize calcined gypsum in forming the gypsum slurry which is fed to the board making machinery and therefore requiring less energy to dry the wet board which comprises:

(1) supplying calcined gypsum feed to be conveyed to a gypsum slurry mixer;

(2) conveying the calcined gypsum feed to a blender;

(3) blending a small amount of water with said calcined gypsum, said water ranging from about 1% to about 8% by weight of the calcined gypsum feed;

(4) allowing the wetted calcined gypsum to heal;

(5) feeding the healed calcined gypsum to the gypsum slurry mixer;

(6) adding additional water to the healed calcined gypsum in the slurry mixer, said additional water being added in an amount sufficient to provide from about 65 to about 85 parts of water, including water added in the blender, per 100 parts of the calcined gypsum which results in a substantially reduced amount of water to be evaporated from the wet board;

(7) mixing the healed calcined gypsum and water in the slurry mixer to form a homogeneous slurry;

(8) feeding the slurry to a gypsum board making machine to form a wet gypsum board;

(9) passing the wet gypsum board to a kiln to dry the board; and

(10) recovering dry gypsum board consisting essentially of calcium sulfate dihydrate.

4,117,071
CONCRETE TANKS WITH INTERLOCKING BOTTOM

James T. Hannah, 231 Main North Rd., Elizabeth Grove, South Australia 5112, Australia

Filed May 11, 1976, Ser. No. 685,320
Int. Cl.[2] B28B 1/16
U.S. Cl. 264—256 4 Claims

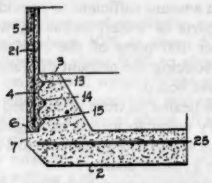
1. The method of forming hollow concrete articles such as tanks which comprises:

(a) providing a mould shaped to form a bottom and including on the bottom an upstanding integral ridge having a face and a laterally outward extending surface which cooperate with a wall of a concrete article to be formed to define the joint between said bottom and wall, said face forming the mould for the contiguous inner lower portions of said wall and said laterally, outward extending surface forming the mould for the lower end face of said wall, said ridge also including an interlocking sealing

formation extending generally parallel to the said bottom and around the face of said upstanding ridge, said interlocking sealing formation having an upstanding dimension at least equal to about the thickness of said bottom and a majority of its upstanding extent arranged to interlock with said wall in shear,

(b) pouring the said bottom,

(c) removing the mould from the said bottom to expose the interlocking sealing formation and the laterally, outward extending surface of said upstanding ridge,



(d) placing a mould on said bottom to form the sides of the concrete article to be formed and shaped to leave exposed the laterally, outward extending surface and the face of the said upstanding ridge having the interlocking sealing formation formed thereon, and

(e) forming the said wall against said mould and face, whereby the said bottom is interlocked with said wall by only concrete-to-concrete contact and with sufficient shear to provide an interlock without any metal reinforcement extending through the said interlocking sealing formation or the joint formed between said bottom and wall.

4,117,072

PROCESS FOR ENHANCEMENT OF MECHANICAL PROPERTIES OF PHOTOCONDUCTIVE POLYMERS

William M. Prest, Jr, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 16, 1974, Ser. No. 515,128
Int. Cl.[2] B29D *7/24*
U.S. Cl. 264—288 23 Claims

1. A process for enhancing the mechanical properties of films of photoconductive polymers, comprising:

(a) subjecting a film of a polymeric photoconductive material to strain induced orientation whereby the chains of the polymer within said film are oriented along the lines of force imparted by the strain to the film, the extent of orientation of the photoconductive polymer being sufficient to both enhance its mechanical properties and impose spatial constraints on the equilibrium molecular conformation of the bulky photoactive groups pendant from its backbone, said constraints causing deterioration in the charge carrier transport properties of the polymeric film; and

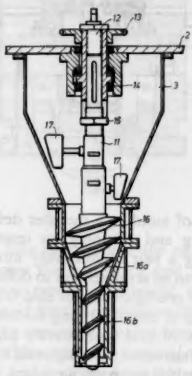
(b) subjecting said oriented film to a second strain subsequent to orientation thereof, the extent of stretching of the oriented film during this second strain being insufficient to cause appreciable realignment of the polymer chains of the oriented film in the direction of the second strain yet sufficient to relieve the spatial constraints imposed upon the bulky photoactive groups pendant from the backbone of the polymer, thereby allowing them to return to their equilibrium molecular conformation.

4,117,073

PROCESS FOR THE PRODUCTION OF PREPLASTICIZED MATERIALS

Heinrich Koch, Siegburg, and Josef Lehnen, Bad Soden bei Salmünster, both of Germany, assignors to Heinrich Koch, Auf der Hohl and Bayer Aktiengesellschaft, Leverkusen, both of, Germany

Filed Oct. 14, 1975, Ser. No. 622,237
Claims priority, application Fed. Rep. of Germany, Oct. 19, 1974, 2449489
Int. Cl.[2] B29B *5/02*
U.S. Cl. 264—349 4 Claims



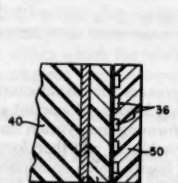
1. A process for the production of materials condensed to their final density from high molecular weight powder-form rubber mixtures, wherein the powder mixture is conveyed along a helical compression screw with decreasing helix diameter fitting closely within a conical casing and is thereby subjected to increasing compression through the application of additional shear forces in the outer zone of the helixes whilst at the same time the powder mixture is condensed and plasticized at a suitable temperature, the powder mixture being stirred and supplied to the helical compression screw by rotating pitched blades which prevent the formation of bridges in the supplied powder mixture, the gaseous constituents present in the powder mixture being continuously taken up by the mixture and carried off outwardly during compression.

4,117,074

MONOLITHIC MOSAIC PIEZOELECTRIC TRANSDUCER UTILIZING TRAPPED ENERGY MODES

Harry F. Tiersten, 2288 Pine Haven Dr., Schenectady, N.Y. 12309; John F. McDonald, 608 Crescent Village Apts., Clifton Pk., N.Y. 12065, and Pankaj K. Das, 15 Johnson Rd., Cohoes, N.Y. 12047

Filed Aug. 30, 1976, Ser. No. 718,603
Int. Cl.[2] H01L *41/10*
U.S. Cl. 310—320 15 Claims



1. A transducer element array comprising:

a plate of piezoelectric material, means for vibrating said

plate to produce vibration thereof including vibration in the thickness extensional mode,

a plurality of first electrode means operatively electrically coupled to one surface of said plate in spaced relationship with respect to each other and second electrode means operatively electrically coupled to said other surface of said plate to form with said plurality of first electrode means a plurality of pairs of electrodes, each said pair of electrodes forming a transducer element of the array,

said plurality of pairs of electrodes being operatively electrically coupled to said piezoelectric plate so as to provide acoustic energy trapping of the thickness extensional mode of vibration in the unelectroded space between adjacent ones of said pairs of electrodes and to thereby provide acoustic isolation between the adjacent transducer elements.

4,117,075
METHOD OF COMBUSTION FOR DEPRESSING NITROGEN OXIDE DISCHARGE

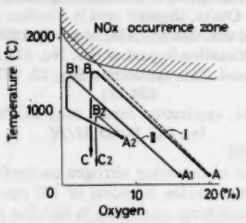
Hiroshi Sano, Ikeda, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Aug. 7, 1974, Ser. No. 495,429

Claims priority, application Japan, Aug. 9, 1973, 48-89468; Aug. 10, 1973, 48-90183; Dec. 25, 1973, 48-1855

Int. Cl.² C01B *21/00*

U.S. Cl. 423—235 **5 Claims**



1. A method for decreasing the discharge of nitrogen oxides by combustion in a medium temperature reducing flame atmosphere comprising the steps of:

(1) producing a high temperature oxidizing flame by combustion of a first fuel with an amount of air in excess of the theoretical amount required for complete combustion of said fuel wherein said combustion produces combustion products containing nitrogen oxides;

(2) admixing the combustion products containing nitrogen oxides with a second fuel selected from the group consisting of carbon monoxide, hydrogen or mixtures thereof at a temperature higher than 1000° C but lower than the critical temperature for the formation of nitrogen oxides, wherein the air to first fuel plus second fuel ratio is maintained greater than that necessary to completely combust said first fuel plus said second fuel and wherein the concentration of oxygen in the resulting waste gas is less than 1%, whereby additional combustion occurs forming a medium-temperature reducing flame atmosphere and decreasing the nitrogen oxides content of said waste gas; and

(3) discharging the resulting waste gas.

4,117,076
TITANIUM SLAG-COKE GRANULES SUITABLE FOR FLUID BED CHLORINATION

Michel Guéguin, Tracy, Canada, assignor to Quebec Iron and Titanium Corporation, Sorel, Canada

Continuation of Ser. No. 675,954, Apr. 12, 1976, abandoned. This application Jun. 30, 1977, Ser. No. 811,761

Int. Cl.² C01G *23/02*

U.S. Cl. 423—78 **7 Claims**

1. In a process for the production of titanium tetrachloride in a fluidized bed containing fluidized particulates from titanium oxide bearing material containing impurities including aluminum oxides and silicon oxides wherein pelletized mixtures of fine grains of bituminous coking coal, said titanium oxide bearing material, and a suitable water soluble binder therefor are employed for obtaining starting material grains for said fluidized bed production of titanium tetrachloride, wherein the improvement comprises coking said pelletized fine grains comprising said titanium oxide bearing material having as further impurities associated therewith alkali-earth impurities selected from the group consisting of CaO and MgO in amounts of 0.6 to 1.0 by weight of CaO, and 3.0 to 5.0 by weight of MgO, said coking being at a temperature up to 900°–950° C., such that said grains contain, after coking, 40–60% by weight of titanium oxide including said impurities and 15–25% carbon, and recovering and subsequently chlorinating titanium oxide in said grains, said grains having a crushing strength from 100–600 grams per millimeter of grain diameter.

4,117,077
PROCESS FOR ALUNITE TREATMENT

Gakif Zakirovich Nasyrov, prospekt Nauki, 12, kv. 49; Evgenia Ivanovna Zemlyanskaya, Gavanskaya ulitsa, 10, kv. 25, and Izabella Vladislavovna Ravdonikas, ulitsa III Internatsionala, 14, kv. 58, all of Leningrad, U.S.S.R.

Continuation of Ser. No. 722,702, Sep. 13, 1976, abandoned. This application Nov. 23, 1977, Ser. No. 854,215

Int. Cl.² C01F *7/06*

U.S. Cl. 423—127 **7 Claims**

1. A process for the treatment of alunite ore containing silicon oxides in the form of opal and chalcedony which comprises:

(a) roasting said alunite ore in the presence of oxygen at a temperature of from 580° to 620° C. for 1 to 3 hours;

(b) decomposing the roasted alunite ore in the presence of a reducing agent at a temperature of from 580° to 620° C. for 40 to 60 minutes, to form a reduced alunite ore;

(c) leaching the reduced alunite ore at a temperature of from 45° to 85° C. by treatment with a solution of sodium hydroxide having a concentration of 100 to 150 grams per liter in terms of Na_2O, to extract aluminum oxide and a mixture of potassium and sodium sulfates into solution, and to form a residue which is separated from said solution;

(d) evaporating said solution to concentrate the sodium hydroxide to 200 to 220 grams per liter in terms of Na_2O, thereby precipitating the potassium and sodium sulfates, and separating said mixed surface precipitate;

(e) diluting the aluminum oxide solution to a sodium hydroxide concentration of from 120 to 150 grams per liter in terms of Na_2O;

(f) precipitating aluminum hydroxide from the aluminum oxide solution by seeding said solution under agitation with aluminum hydroxide; and

(g) separating the aluminum hydroxide.

4,117,078
PROCESS FOR THE PRODUCTION OF HIGHLY CONCENTRATED MAGNESIUM CHLORIDE SOLUTIONS

Dietmar Kunze, Bad Salzdetfurth, Fed. Rep. of Germany, assignor to Kali und Salz Aktiengesellschaft, Kassel, Fed. Rep. of Germany

Filed Mar. 29, 1977, Ser. No. 782,410

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1976, 2613288

Int. Cl.² C01F *5/30*; C01D *3/06*; C01F *11/46*

U.S. Cl. 423—163 **9 Claims**

7. In a process for the production of highly concentrated magnesium chloride solutions from industrial liquors or brines which contain less than 320 g/l $MgCl_2$, and which also normally contain alkali metal chlorides, bromides and sulfates and other impurities, wherein the production steps include de-

bromination by means of chlorine, neutralization, sulfate precipitation, concentration, cooling and separation of crystallizates and impurities, the improvement which comprises:

(a) adding to an industrial liquor or brine at temperatures in the range of 30°–50° C a stoichiometric excess of calcium chloride, based on the sulfate ion content of the liquor, to form a calcium sulfate dihydrate crystallizate;
(b) separating said crystallizate from the remaining liquor;
(c) debrominating said remaining liquor by the addition of chlorine thereto;
(d) neutralizing the debrominated liquor up to a pH value of 3–6 to form a precipitate;
(e) separating the precipitate from said neutralized liquor;
(f) admixing with said neutralized liquor a sufficient amount of carnallite to increase the $MgCl_2$ content thereof to 270–330 g/l after cold decomposition of the added carnallite;
(g) concentrating the resulting liquor up to a concentration of 440 to 475 g/l $MgCl_2$ in two or more steps in a direct current multi-stage evaporator;
(h) cooling the concentrate to room temperature; and
(i) separating said concentrate from the solid substances formed during the concentration, said solid substances consisting essentially of carnallite and sodium chloride.

4,117,079

REMOVAL OF A GAS COMPONENT PRESENT IN A GASEOUS STREAM

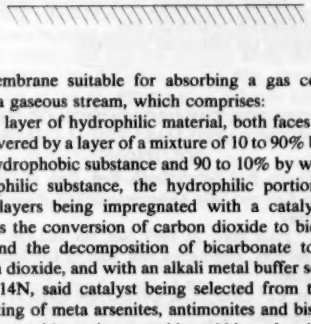
Richard James Bellows, Linden, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Jun. 2, 1977, Ser. No. 802,660

Claims priority, application United Kingdom, Jun. 11, 1976, 24299/76

Int. Cl.² B01D *53/34*

U.S. Cl. 423—223 **25 Claims**



1. A membrane suitable for absorbing a gas component present in a gaseous stream, which comprises:

a porous layer of hydrophilic material, both faces of which are covered by a layer of a mixture of 10 to 90% by weight of a hydrophobic substance and 90 to 10% by weight of a hydrophilic substance, the hydrophilic portions of the three layers being impregnated with a catalyst which permits the conversion of carbon dioxide to bicarbonate ions and the decomposition of bicarbonate to gaseous carbon dioxide, and with an alkali metal buffer solution of 12 to 14N, said catalyst being selected from the group consisting of meta arsenites, antimonites and bismuthites, arsenious oxide, antimony oxide and bismuth oxide, potassium selenite, tellurite and metaborate, sodium selenite, tellurite and metaborate, selenious acid and a mixture of boric acid and diethanolamine, the concentration of said catalyst being 0.1 to 3M.

4,117,080

PROCESS FOR REGENERATING PERMANGANATE AND/OR MANGANATE FROM MANGANESE DIOXIDE

Hideo Kawasaki; Masaji Nakatani; Toshihiro Ishii; Hiroshi Nakagawa, and Hiroshi Takaya, all of Tokyo, Japan, assignors to Nissan Engineering Ltd., Tokyo, Japan

Filed Apr. 28, 1977, Ser. No. 791,995

Claims priority, application Japan, May 7, 1976, 51-52545

Int. Cl.² C01G *45/12*

U.S. Cl. 423—235 **9 Claims**

1. A process for producing at least one member selected from the group consisting of permanganates and manganates from manganese dioxide which comprises

forming a dispersion of manganese dioxide in an aqueous solution of sodium or potassium hydroxide having a concentration of said hydroxide greater than 20% by weight, and contacting with said dispersion a gas containing NO_x having a molar ratio of NO_2/NO_x greater than 0.55 in the presence of at least one member selected from the group consisting of permanganates and manganates at a temperature above 40° C.

4,117,081

METHOD OF AND CATALYSTS FOR REMOVAL OF NITROGEN OXIDES

Hideya Inaba; Shigenori Onizuka, and Yasumi Kamino, all of Osaka, Japan, assignors to Hitachi Shipbuilding & Engineering Co., Ltd., Osaka, Japan

Continuation of Ser. No. 667,674, Mar. 17, 1976, abandoned, which is a continuation-in-part of Ser. No. 471,182, May 20, 1974, abandoned. This application Sep. 23, 1977, Ser. No. 836,131

Claims priority, application Japan, May 28, 1973, 48-59479

Int. Cl.² B01D *53/34*

U.S. Cl. 423—239 **4 Claims**

1. The method of removing nitrogen oxides from a flue gas containing sulphur oxides in excess of 100 ppm, oxygen and water vapor, comprising employing in said flue gas at least one of the reductants hydrogen and carbon monoxide in an amount between 1 and 2 times the theoretical amount required to reduce said nitrogen oxides and to react with said oxygen, and contacting said flue gas and reductant with a catalyst at a temperature in the range of about 300°–450° C, said catalyst consisting essentially of about 5.0% by weight of copper; about 0.005 to 0.05% by weight of rhodium; about 3.0% by weight of one of the metals potassium, barium, magnesium, chromium, manganese and molybdenum; and alumina; said catalyst acting to promote the substantially complete reduction of said nitrogen oxides by and the substantially complete reaction of said oxygen with said reductant, with substantially no conversion of said sulphur oxides into another substance and with substantially no conversion of said nitrogen oxides into ammonia.

4,117,082

METHOD OF COMPLETELY OXIDIZING CARBON MONOXIDE

Akira Matsuyama, Toyonaka, Japan, assignor to Figaro Giken Co., Ltd., Toyonaka, Japan

Division of Ser. No. 565,730, Apr. 7, 1975, abandoned. This application Feb. 7, 1977, Ser. No. 766,118

Claims priority, application Japan, Apr. 19, 1974, 49-44896; Apr. 26, 1974, 49-48200

Int. Cl.² B01D *53/34*

U.S. Cl. 423—247 **2 Claims**

1. A process for completely oxidizing carbon monoxide comprising contacting carbon monoxide in the presence of oxygen with a catalyst at a temperature as low as 79° C., wherein said catalyst is formed by firing at 800° C. for one hour a mixture of finely divided SnO_2 and an aqueous solution of rhodium chloride in an amount of 5 atm. % calculated as Rh based on the SnO_2, mixing an aqueous suspension of the fired product with finely divided alpha-Al_2O_3 in an amount equal to

that of the SnO_2 and aging the resultant mixture at 300° C. for 1 day.

4,117,083

PROCESS FOR INCREASING THE REACTION RATE OF UO_2F_2

Edward T. Maas, Jr., Kendall Park, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Dec. 21, 1976, Ser. No. 752,722
Int. Cl.[2] C01G *43/00*
U.S. Cl. 423—253 **48 Claims**

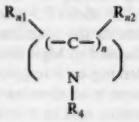
1. A process for increasing the average reaction rate of reduction of UO_2F_2 comprising:

(a) combining UO_2F_2 with an organic compound capable of interacting with said UO_2F_2 to form a reaction product containing from 0.5 to 3.0 moles of said organic compound per mole of UO_2F_2, said organic compound selected from the group consisting of

amines of generalized formula

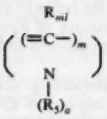
where at least one of radicals R_1, R_2 and R_3 is an aliphatic or an aromatic carbon network with carbon numbers of 1 to 6 with the remaining radicals, if any, being H,

aliphatic heterocyclic amines of generalized formula



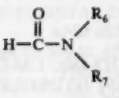
where R_4 is H or an aliphatic radical of carbon number of 1 to 4 and n can assume values of 4 to 6 inclusive and R_{n1} and R_{n2} are each individually H or methyl, each of R_{n1} and R_{n2} being the same or different;

aromatic heterocyclic amines of generalized formula



where m is an integer of 4 to 6 inclusive and $a = 1$ when $m = 4$ or 6 and $a = 0$ when $m = 5$, and R_5 is H or aliphatic radical of carbon number 1 to 4 and R_{m1} is H or methyl,

aliphatic amides of formic acid of generalized formula



where R_6 and R_7 are each individually H or an aliphatic radical of carbon number 1 to 3, each of R_6 and R_7 being the same or different,

alcohols of generalized formula

$$R_8 - O - H$$

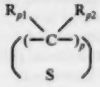
where R_8 is an aliphatic radical of carbon number 1 to 4 inclusive,

sulfides of generalized formula

$$R_9 - S - R_{10}$$

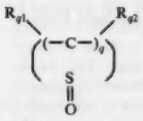
where R_9 and R_{10} are the same or different aliphatic radicals having a carbon number of 1 to 3,

aliphatic heterocyclic sulfides of generalized formula



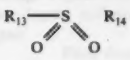
where p is an integer between 4 and 6 inclusive and R_{p1} and R_{p2} are each individually H or methyl, each of R_{p1} and R_{p2} being the same or different,

aliphatic heterocyclic sulfoxides of generalized formula



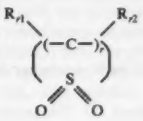
where q is an integer of 4 to 6 inclusive and R_{q1} and R_{q2} are each individually H or methyl, each of R_{q1} and R_{q2} being the same or different,

sulfones of generalized formula



where R_{13} and R_{14} are aliphatic radicals of carbon number 1 to 3,

aliphatic heterocyclic sulfones of generalized formula



where r is an integer of 4 to 6 inclusive and R_{r1} and R_{r2} are each individually H or methyl, each of R_{r1} and R_{r2} being the same or different, and mixtures thereof,

(b) decomposing said reaction product to yield UO_2F_2 in an increased kinetically reactive state.

4,117,084

PROCESS FOR PRODUCING UO_2F_2

Edward T. Maas, Jr., Kendall Park, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Dec. 21, 1976, Ser. No. 752,736
Int. Cl.[2] C01G *43/02, 43/06*
U.S. Cl. 423—253 **29 Claims**

1. A process for producing UO_2F_2 comprising:

(a) adding a soluble uranyl salt to an organic solvent which exhibits Lewis Base characteristics said uranyl salt being selected from the group consisting of uranyl acetate and uranyl nitrate;

(b) adding a soluble fluoride salt to said solvent to form a reaction solution so that said uranyl salt and said fluoride salt react to produce a crystalline solid having the structure $UO_2F_2 \cdot (X)$ base;

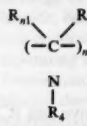
(c) separating said crystalline solid from said reaction solution; and

(d) heating said $UO_2F_2 \cdot (X)$ base to a sufficient temperature to produce said UO_2F_2.

7. The process of claim 1 in which said solvent is selected from the group consisting of amines of generalized formula

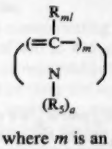
where at least one of radicals R_1, R_2 and R_3 is an aliphatic or an aromatic carbon network with carbon numbers of 1 to 6 with the remaining radicals, if any, being H,

aliphatic heterocyclic amines of generalized formula



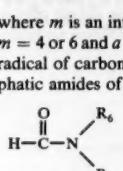
where R_4 is H or an aliphatic radical of carbon number of 1 to 4 and n can assume values of 4 to 6 inclusive and R_{n1} and R_{n2} are each individually H or methyl, each of R_{n1} and R_{n2} being the same or different,

aromatic heterocyclic amines of generalized formula



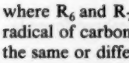
where m is an integer of 4 to 6 inclusive and $a = 1$ when $m = 4$ or 6 and $a = 0$ when $m = 5$, and R_5 is H or aliphatic radical of carbon number 1 to 4 and R_{m1} is H or methyl,

aliphatic amides of formic acid of generalized formula



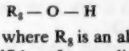
where R_6 and R_7 are each individually H or an aliphatic radical of carbon number 1 to 3, each of R_6 and R_7 being the same or different,

alcohols of generalized formula



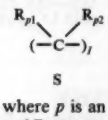
where R_8 is an aliphatic radical of carbon number 3 or 4,

sulfides of generalized formula



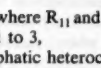
where R_9 and R_{10} are the same or different aliphatic radicals having a carbon number of 1 to 3,

aliphatic heterocyclic sulfides of generalized formula



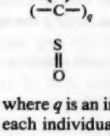
where p is an integer between 4 and 6 inclusive and R_{p1} and R_{p2} are each individually H or methyl, each of R_{p1} and R_{p2} being the same or different,

sulfoxides of generalized formula



where R_{11} and R_{12} are aliphatic radicals of carbon number 1 to 3,

aliphatic heterocyclic sulfoxides of generalized formula

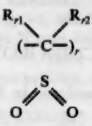


where q is an integer of 4 to 6 inclusive and R_{q1} and R_{q2} are each individually H or methyl, each of R_{q1} and R_{q2} being the same or different,

sulfones of generalized formula

where R_{13} and R_{14} are aliphatic radicals of carbon 1 to 3,

aliphatic heterocyclic sulfones of generalized formula



where r is an integer of 4 to 6 inclusive and R_{r1} and R_{r2} are each individually H or methyl, each of R_{r1} and R_{r2} being the same or different, and mixtures thereof.

19. The process of claim **1** in which said solvent is selected from the group consisting of aniline, pyridine, 2-picoline, 4-picoline, N,N-dimethylformamide, n-propylalcohol, tetrahydrothiophene, dimethylsulfoxide, tetramethylenesulfoxide, tetramethylenesulfone, and mixtures thereof.

4,117,085

TREATMENT OF ALUMINA TO REDUCE DISCOLORATION

Kang Yang, and John F. Scamehorn, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Jun. 20, 1977, Ser. No. 807,857

Int. Cl.[2] **C01F** *7/02*

U.S. Cl. 423—264 **3 Claims**

1. A method for reducing discoloration of alumina, said alumina having been prepared by water hydrolysis of aluminum alkoxides, said discoloration being due to exposure to high temperatures, said method comprising adding an effective amount, in the range of about 1×10^{-6} to about 0.5 gram per gram of alumina, of hydrogen peroxide to the alumina after hydrolysis and prior to the exposure thereof to high temperatures, said term high temperatures referring to a temperature above 127° C. when the alumina is present in an alumina-water slurry containing at least 3 percent alumina and to a temperature of above 100° C. when the alumina contains less than about 40 weight percent water.

2. In the method of removing water from an alumina-water slurry, said slurry containing at least 3 weight percent alumina, said alumina having been prepared by water hydrolysis of aluminum alkoxides, by drying at a temperature above 127° C., the improvement which comprises adding an effective amount to reduce discoloration of said alumina, in the range of about 1×10^{-6} to about 0.5 gram per gram of alumina, of hydrogen peroxide to the alumina-water slurry after hydrolysis and prior to the drying.

3. In the method of storing and transporting alumina, wherein the alumina is at a temperature of above 100° C. for at least 1 hour, said alumina having been prepared by water hydrolysis of aluminum alkoxides and containing less than about 40 weight percent water, the improvement which comprises adding an effective amount to reduce discoloration of said alumina, in the range of about 1×10^{-6} to about 0.5 gram per gram of alumina, of hydrogen peroxide to the alumina after hydrolysis and prior to storage and transport at said temperature.

4,117,086

PROCESS OF STABILIZATION OF DIBASIC CALCIUM PHOSPHATE DIHYDRATE AGAINST HYDROLYSIS WITH 3-AMINO-1-HYDROXYPROPANE-1,1-DIPHOSPHONIC ACID

Walter Plöger, Hilden, Fed. Rep. of Germany, assignor to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf-Holthausen, Fed. Rep. of Germany

Filed Dec. 1, 1975, Ser. No. 636,735

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1974, 2456692

Int. Cl.[2] **C01B** *15/16, 25/26*

U.S. Cl. 423—268 **5 Claims**

1. A process for stabilizing dibasic calcium phosphate dihydrate against hydrolysis consisting essentially of suspending

dibasic calcium phosphate dihydrate in an aqueous medium at a pH of from 5 to 10, containing from 0.01% to 5% by weight based on the content of said dibasic calcium phosphate dihydrate of a diphosphonic compound selected from the group consisting of (A) 3-amino-1-hydroxypropane-1,1-diphosphonic acid, and (B) water-soluble salts thereof, and separating said stabilized dibasic calcium phosphate dihydrate.

4,117,087

PROCESS FOR PREPARING STABILIZED SODIUM PERCARBONATE

Helmut Dillenburg, Rheinbrohl; Wilhelm Moser, Ariendorf b. Hoenningen, both of Fed. Rep. of Germany, and Robert Jones, Brussels, Belgium, assignors to Peroxid-Chemie GmbH., Minich, Fed. Rep. of Germany

Filed May 17, 1977, Ser. No. 797,757

Claims priority, application Fed. Rep. of Germany, May 20, 1976, 2622458

Int. Cl.[2] C01B *15/10*

U.S. Cl. 423—275 **17 Claims**

1. A process for preparing a stabilized crystalline sodium percarbonate of substantially spheroidal crystal form consisting essentially of the steps of:

a. preparing an aqueous medium containing sodium carbonate and having a pH value of between about 10 and about 11;

b. adding to the aqueous medium an amount of a water soluble silicate which is equivalent to from about 0.2 to about 0.9% by weight of SiO_2 relative to the amount of the sodium percarbonate to be formed during which step the pH value of the aqueous medium is maintained in the range of between about 10 and about 11;

c. reacting the resulting aqueous medium with an aqueous hydrogen peroxide solution containing a heavy metal complexing agent, whereby a reaction mixture containing sodium percarbonate is formed;

d. crystallizing only a portion of about 50% to about 90% of the sodium percarbonate within the reaction mixture;

e. adding to said suspension an amount of a water soluble silicate which is equivalent to from about 0.2 to about 0.8% by weight of SiO_2 relative to the total amount of sodium percarbonate and which is sufficient to provide for a total content of silicate in the final crystalline product, equivalent to from about 0.5 to about 1.5% by weight of SiO_2 relative to the amount of sodium percarbonate;

f. crystallizing substantially the remaining portion of the crystallizable sodium percarbonate within said suspension; and,

g. recovering a crystalline sodium percarbonate of substantially spheroidal crystal form from said suspension.

4,117,088

HYDROPHOSPHIDE-GROUP CONTAINING MULTI-METAL INORGANIC POLYMERIC COMPLEX AND METHOD OF MAKING SAME

George G. Merkl, 46 Sunset Ct., Haworth, N.J. 07651

Filed Jan. 10, 1977, Ser. No. 758,345

Int. Cl.[2] C01B *25/00, 15/16, 25/26*

U.S. Cl. 423—299 **17 Claims**

1. A method of producing an inorganic multi-metal polymeric complex containing a plurality of hydrophosphide groups which comprises:

reacting in an aqueous medium at a temperature of about 40° C to about 100° C

(a) at least one non-alkaline metal selected from Groups I–VIII of the Periodic Table;

(b) an alkali metal hydroxide; and

(c) a phosphorus-containing compound capable of conversion to hydrophosphide groups under the conditions prevailing in the aqueous reaction medium

according to the following:

(i) introducing a predetermined quantity of said non-alkaline metal into a reaction vessel containing said aqueous medium;

(ii) providing in said aqueous medium a supply of alkali metal hydroxide to achieve a highly alkaline pH in said aqueous medium;

(iii) incrementally introducing said phosphorus-containing compound into said aqueous medium, whereby hydrophosphide groups are formed which react with dissolved metal ions of said non-alkaline metal and alkali metal, the rate of introduction of said phosphorus-containing compound corresponding approximately proportionately to the rate of dissolution of the non-alkaline metal;

(iv) stopping the incremental introduction of said phosphorus-containing compound when the pH of said aqueous medium is reduced to a pH of about 8.5 to about 10.5, such reduction in pH being indicative of organic polymeric complex production; and

(v) thereafter terminating the reaction by removing from the aqueous medium any unreacted non-alkaline metal.

4,117,089

PROCESS FOR PREPARING SODIUM AMMONIUM HYDROGEN-PHOSPHATE AND AMMONIUM CHLORIDE FROM WET PROCESS PHOSPHORIC ACID

Yoshishige Fujita; Soichi Asagao, and Motoshige Ogura, all of Ube, Japan, assignors to Central Glass Company, Limited, Japan

Filed Aug. 9, 1977, Ser. No. 823,168

Claims priority, application Japan, Aug. 10, 1976, 51-94499

Int. Cl.[2] C01B *15/16, 25/26;* **C01C** *1/16*

U.S. Cl. 423—306 **12 Claims**

1. A process for producing sodium ammonium hydrogenphosphate and ammonium chloride from wet process phosphoric acid, the process comprising the steps of:

(a) introducing ammonia into a wet process phosphoric acid solution until the pH of said solution ranges from 3.5 to 6.0 to cause precipitation of impurities contained in said solution, said solution being maintained at a temperature above 60° C. upon completion of the introduction of ammonia;

(b) separating at least a portion of the precipitated impurities from said solution, the resulting solution having a molar ratio of NH_3/H_3PO_4 of from 0.7 to 1.5;

(c) adding the solution from which said impurities have been separated, to a circulating mother liquor maintained at temperatures within which sodium ammonium hydrogenphosphate is hard to precipitate;

(d) introducing sodium chloride into the solution in step (a) or into the mother liquor in step (c);

(e) additionally introducing ammonia into the liquor until the pH of said liquor ranges from 5.5 to 9.0, the total amounts of ammonia introduced in steps (a) and (e) and of sodium chloride introduced in step (d) being such that the molar ratios of H_3PO_4:NH_3:NaCl are in the range of 1:1.6–2.5:0.2–2.8;

(f) cooling of the liquor to a temperature of 30° C. to 60° C. to permit sodium ammonium hydrogenphosphate to separate as crystals;

(g) removing said crystals from the liquor;

(h) adding to the liquor from which said crystals have been removed, an acidic compound selected from the group consisting of phosphoric acid, acidic ammonium phosphate, hydrochloric acid, sulfuric acid, nitric acid and a mixture thereof, thereby adjusting the pH of the liquor to 5.6–6.4;

(i) cooling the resulting liquor to a temperature which is lower than the temperature of step (f) and which ranges from 5° C. to 50° C. to precipitate ammonium chloride as crystals;

(j) removing the ammonium chloride crystals from the liquor; and

(k) recycling the resulting solution for use as a circulating mother liquor.

4,117,090

PROCESS OF STABILIZATION OF DIBASIC CALCIUM PHOSPHATE DIHYDRATE AGAINST HYDROLYSIS WITH AZACYCLOALKANE-2,2-DIPHOSPHONIC ACIDS

Walter Plöger, Hilden, Germany, assignor to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf-Holthausen, Germany

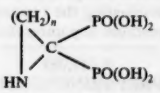
Filed Dec. 1, 1975, Ser. No. 636,732

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1974, 2456666

Int. Cl.[2] C01B *15/16, 25/26*

U.S. Cl. 423—268 5 Claims

1. A process for stabilizing dibasic calcium phosphate dihydrate against hydrolysis consisting essentially of suspending dibasic calcium phosphate dihydrate in an aqueous medium at a pH of from 5 to 10, containing from 0.01% to 5% by weight based on the content of said dibasic calcium phosphate dihydrate of an azacycloalkane-2,2-diphosphonic compound selected from the group consisting of (A) compounds of the formula



wherein *n* is an integer from 3 to 5, and (B) water-soluble salts thereof, and separating said stabilized dibasic calcium phosphate dihydrate.

4,117,091

WET PROCESS PHOSPHORIC ACID PRODUCED USING GYPSUM-CONTAINING WASTE WATER

Santad Kongpricha, Deer Park, Tex., assignor to Olin Corporation, New Haven, Conn.

Filed Jun. 17, 1976, Ser. No. 697,179

Int. Cl.[2] C01B *25/16*

U.S. Cl. 423—320 4 Claims

1. In a process for producing phosphoric acid by the digestion of phosphate rock with diluted sulfuric acid obtained by the dilution of concentrated sulfuric acid with gypsum-containing waste water having a CaO concentration of from about 1,000 to 3,000 parts per million, the improvement which comprises:

a. introducing said concentrated sulfuric acid into a mixing tee;

b. admixing sufficient amounts of said gypsum-containing waste water with said concentrated sulfuric acid in said mixing tee to produce a diluted acid solution containing from about 70 to about 75 percent by weight of H_2SO_4,

c. cooling said diluted acid solution in a liquid-to-liquid heat exchanger, said heat exchanger remaining substantially free of gypsum scale as a result of the combination of calcium concentration, H_2SO_4 concentration, and temperature therein; and

d. feeding said diluted acid solution directly to a digestion reactor containing said phosphate rock to produce said wet phosphoric acid.

4,117,092

PROCESS FOR SEPARATING A PHOSPHORIC ACID-SOLVENT SOLUTION

Klaus Beltz, Budenheim, Rhein, and Klaus Frankenfeld, Hunfelden-Kirberg Mainzer, both of Germany, assignors to Chemische Fabrik Budenheim, Budenheim, Rhein, Germany

Continuation of Ser. No. 753,727, Dec. 23, 1976, abandoned, which is a continuation of Ser. No. 594,522, Jul. 9, 1975, abandoned. This application Dec. 27, 1977, Ser. No. 864,158

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1974, 2433307

Int. Cl.[2] C01B *25/16*

U.S. Cl. 423—321 S 12 Claims

1. A countercurrent multi-zoned process for separating an organic solvent from a phosphoric acid-solvent-solution whereby the organic solvent is miscible in all proportions with phosphoric acid and water to separate substantially all of said organic solvent as a mixture of water and organic solvent by the addition of an alkali material comprising the steps:

(a) introducing said phosphoric acid-solvent-solution into a first zone of a multi-zoned extractor;

(b) introducing an alkali (M) compound wherein the cation is selected from the group consisting of sodium, potassium and ammonium ions into said multi-zoned extractor in a zone downstream from said first zone of said multi-zoned extractor to effect a countercurrent contact in said multi-zoned extractor of said solution, the amount of alkali compound being added to cause in each zone a phase separation of said solution into an aqueous alkali phosphate phase and a solvent phase whereby an aqueous alkali phosphate phase in each zone of said multi-zoned extractor has a mole ratio of $M_2O:P_2O_5$ of from 0.45:1 to 0.90:1;

(c) separating by decantation in each zone of said multi-zoned extractor said alkali phosphate phase and said solvent phase, prior to passage of said respective phases to an upstream and downstream zone, respectively, of said multi-zoned extractor;

(d) withdrawing said aqueous organic solution substantially free of phosphoric acid from a last zone of said multi-zoned-extractor; and

(e) withdrawing said aqueous alkali phosphate solution having a ratio of $M_2O:P_2O_5$ from 0.45:1 to 0.90:1 substantially free of organic solvent from said first zone of said multi-zoned-extractor.

4,117,093

METHOD OF MAKING AN AMORPHOUS SILICON DIOXIDE FREE OF METAL IONS

Friedrich Christian Brunner; Friedrich Wilhelm Schwerdt, both of Sindelfingen, and Hans-Heinz Steinbeck, Boeblingen, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 17, 1977, Ser. No. 807,759

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1976, 2629709

Int. Cl.[2] C01B *33/12, 33/18*

U.S. Cl. 423—339 5 Claims

1. A method of making an amorphous silicon dioxide free of metal ions comprising boiling a mixture of a hydroxybenzene, water, high grade silicon and organic amine in molar surplus to the amount of silicon and hydroxybenzene under reflux with bubbling oxygen to precipitate silicon dioxide, and rinsing the precipitated silicon dioxide with water.

4,117,094

PROCESS FOR SILICON AND TRICHLOROSILANE PRODUCTION

John M. Blocher, Jr., Worthington, and Melvin F. Browning, Upper Arlington, both of Ohio, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 13, 1977, Ser. No. 806,245

Int. Cl.[2] C01B *33/02, 33/08*

U.S. Cl. 423—342 6 Claims

1. A method for converting silicon tetrachloride to trichlorosilane comprising the steps of:

reacting silicon tetrachloride with elemental silicon at a temperature above 1400° k to form silicon dichloride, mixing hydrogen chloride with the silicon dichloride so formed to effect a stoichiometric ratio of hydrogen chloride to silicon dichloride of approximately 1:1 then quenching the dichloride-hydrogen chloride mixture to a temperature below 800° C, thereby forming trichlorosilane without polymer formation.

5. A method for converting metallurgical grade silicon to semiconductor grade silicon comprising the steps of:

reacting metallurgical grade silicon above 1400° K with

silicon tetrachloride and hydrogen to form silicon dichloride; mixing hydrogen chloride with the silicon dichloride so formed to effect a stoichiometric ratio of hydrogen chloride to silicon dichloride of approximately 1:1

quenching the dichloride-hydrogen chloride mixture to a temperature below 800° C within two seconds to form trichlorosilane, without polymer formation;

purifying the trichlorosilane;

converting the trichlorosilane in a deposition reactor to semiconductor grade silicon and an effluent consisting essentially of hydrogen, hydrogen chloride, silicon tetrachloride and unreacted trichlorosilane; and then

separating the tetrachloride and hydrogen from the effluent and recycling said tetrachloride to react with additional metallurgical grade silicon.

4,117,095

METHOD OF MAKING α TYPE SILICON NITRIDE POWDER

Katsutoshi Komeya, Yokohama; Hiroshi Inoue, Kawaguchi, and Takao Ohta, Tokyo, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Sep. 22, 1976, Ser. No. 725,669

Claims priority, application Japan, Sep. 22, 1975, 50-113762

Int. Cl.[2] C01B *21/06*

U.S. Cl. 423—344 **5 Claims**

1. A method for manufacturing an α silicon nitride powder, consisting essentially of the steps of:

(a) admixing 1 part silica powder, 0.4 to 4 parts carbon powder and 0.01 to 2.0 parts metallic silicon powder;

(b) heating said mixture at 1350°–1550° C. in a non-oxidizing atmosphere containing at least one of nitrogen or ammonia and optionally at least one component selected from the group consisting of CO, H_2 and AR to effect the formation of α silicon nitride; and

(c) heating the so formed α silicon nitride at 600°–800° C. in an oxidizing atmosphere to effect decarbonization of said silicon nitride.

4,117,096

PROCESS FOR PRODUCING POWDER OF β-TYPE SILICON CARBIDE

Takuo Hosaka, Toyota; Tadao Sasaki, Shijiyonawate, and Hiroshige Suzuki, Tokyo, all of Japan, assignors to Nippon Crucible Co., Ltd., Tokyo, Japan

Filed Aug. 18, 1977, Ser. No. 825,733

Claims priority, application Japan, Aug. 20, 1976, 51-99281

Int. Cl.[2] C01B *31/36*

U.S. Cl. 423—345 **5 Claims**

1. A process for producing a powder of β-type silicon carbide, which comprises heating a mixture of a carbon powder having a particle size of about 20 microns or less and a metallic silicon powder having a particle size not greater than 200 microns with a carbon-to-silicon molar ration of 1:0.6 to 1:2 to a temperature of 800° to about 1400° C in an oxidizing atmosphere having an oxygen concentration of 0.3 to 35% by volume, to thereby induce a spontaneous continuous reaction between carbon and silicon and effect the formation of β-type silicon carbide.

4,117,097

CONTINUOUS PROCESS FOR THE PRODUCTION OF A COMPACT, COARSE SODIUM PERCARBONATE

Hans Klebe, Rheinfelden; Gerd Knippschild, Wehr, and Hubert Schuster, Karsau-Beuggen, all of Germany, assignors to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

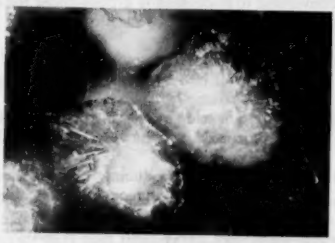
Filed Sep. 27, 1977, Ser. No. 837,221

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1976, 2644148

Int. Cl.[2] C01B *15/10*

U.S. Cl. 423—415 P **8 Claims**

1. A continuous process for the production of a compact, coarse abrasion resistant sodium percarbonate by reaction of sodium carbonate and hydrogen peroxide in the presence of sodium percarbonate inocculant seeds, sodium chloride, known active oxygen stabilizers and sodium hexametaphosphate at 10°–20° C., said process comprising feeding into the preliminary inocculant an aqueous hydrogen peroxide solution containing an active oxygen stabilizer and simultaneously either (1) a filtered solution saturated in sodium carbonate and containing 40–100 grams per liter of sodium percarbonate, 0.1–1.0 gram of sodium hexametaphosphate per liter, 100–200 grams of sodium chloride per liter and an active oxygen stabilizer or (2) a mother liquor containing 40–100 grams of sodium percarbonate per liter, 0.1–1.0 gram of sodium hexametaphosphate per liter, 100–200 grams of sodium chloride per liter of solution and an active oxygen stabilizer, with the proviso that



when the mother liquor is employed there is also fed into the preliminary inocculant such an amount of calcined soda that no sodium carbonate decahydrate forms as a solid phase in the preliminary inocculant, the amount of hydrogen peroxide added being approximately equivalent to the amount of dissolved sodium carbonate for reaction, while maintaining the same temperature during the entire process of precipitating sodium percarbonate, the supersaturation initially formed upon addition of the hydrogen peroxide being reduced by the precipitation of the sodium percarbonate, separating the precipitated sodium percarbonate, drying the separated sodium percarbonate and returning the resulting mother liquor after separation of the precipitated sodium percarbonate again into the first step of the process.

4,117,098

PROCESS FOR MANUFACTURING A CARBONACEOUS MATERIAL

Katsunobu Tatsumoto, Tokyo, and Kenji Fukuda, Omuta, both of Japan, assignors to Mitsui Mining Company, Limited and Mitsui Coke Co., Ltd., both of Tokyo, Japan

Filed Jun. 30, 1976, Ser. No. 701,409

Claims priority, application Japan, Aug. 4, 1975, 50-94228

Int. Cl.[2] C01B *31/04;* C10B *53/08, 53/04*

U.S. Cl. 423—448 **13 Claims**

1. A process for manufacturing an isotropic carbonaceous substance having a high density and a high crushing strength, which comprises the steps of (a) extracting organic components from at least one coal component of a lower rank of coalification than a sub-bituminous C coal by means of a solvent to produce a solvent-containing extract; (b) removing said solvent from said extract and (c) heating said extract at a temperature not exceeding 450° C. for a period of time sufficient to produce an istropic green coke which is 90 to about 98% insoluble in benzene and about 60 to about 85% insoluble in quinoline.

4,117,099

HYDROSULFIDE-GROUPS CONTAINING MULTI-METAL INORGANIC POLYMERIC COMPLEX AND METHOD OF MAKING SAME

George G. Merkl, 46 Sunset Ct., Haworth, N.J. 07641

Filed Dec. 8, 1976, Ser. No. 748,416

Int. Cl.[2] C01B *17/00, 17/32;* **B01J** *27/02*

U.S. Cl. 423—511 **25 Claims**

1. A method of producing an inorganic multi-metal polymeric complex containing a plurality of hydrosulfide groups which comprises:

reacting in an aqueous medium

(a) at least one non-alkaline metal selected from Groups I-VIII of the Periodic Table;

(b) an alkali metal hydroxide; and

(c) an inorganic sulfur containing compound capable of conversion to hydrosulfide groups under the conditions prevailing in the aqueous reaction medium

according to the following:

(i) introducing a predetermined quantity of said non-alkaline metal into a reaction vessel containing said aqueous medium;

(ii) providing in said aqueous medium a supply of alkali metal hydroxide to achieve a highly alkaline pH in said aqueous medium;

(iii) incrementally introducing said sulfur-containing compound into said aqueous medium, whereby said sulfur-containing compound is converted to hydrosulfide groups which react with dissolved metal ions of said non-alkaline metal and alkali metal hydroxide, the rate of the incremented introduction of said sulfur-containing compound corresponding approximately proportionately to the rate of dissolution of the non-alkaline metal, whereby the hydrosulfide groups formed are tied up and bound with the dissolved non-alkaline metal and alkali metal ions, the introduction of said sulfur-containing compound effecting a slow reduction of the pH of said aqueous medium;

(iv) stopping the incremental introduction of said sulfur-containing compound after some finite reduction in the pH of said aqueous medium, such reduction in pH being indicative of inorganic polymeric complex production; and

(v) terminating the reaction by removing from the aqueous medium any unreacted non-alkaline metal.

4,117,100

PROCESS FOR REDUCTION OF SULFUR DIOXIDE TO SULFUR

Lars Hellmer, Widdersdorf; Gerald Koller; Ghazi Rashid Al Muddarris, both of Cologne, and Kuldip Kumar Sud, Weiden, all of Fed. Rep. of Germany, assignors to Davy Powergas GmbH, Fed. Rep. of Germany

Filed Mar. 29, 1977, Ser. No. 782,360

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1976, 2613343

Int. Cl.[2] C01B *17/04*

U.S. Cl. 423—569 **20 Claims**

1. A process for producing elemental sulfur from sulfur dioxide-containing gases having at least about 10 percent sulfur dioxide therein comprising

introducing a carbonaceous fuel and an oxygen-containing gas into a thermal reduction zone, said oxygen-containing gas being up to about a sufficient amount on a stoichiometric basis for complete combustion of the fuel,

combusting said carbonaceous fuel with said oxygen-containing gas within the thermal reduction zone to provide combustion gases having temperatures at about 1100° to 2000° C. and to provide sufficient heat to maintain thermal reduction temperatures in the thermal reduction zone;

introducing a reducing agent capable of reducing sulfur dioxide to sulfur in the thermal reduction zone;

introducing into the thermal reduction zone, and commingling said sulfur dioxide-containing gases with the combustion gases wherein said combusting has proceeded sufficiently such that the combustion gases contain less than about 0.2 volume percent free or molecular oxygen, and wherein the mole ratio of hydrogen equivalents contained in said reducing agent and in said combusted gases to sulfur dioxide provided for thermal reduction in the thermal reduction zone is about 1.8 to 2.2;

thermally reducing about 50 to 80 percent of the sulfur dioxide in the sulfur dioxide-containing gases to elemental sulfur in the thermal reduction zone under reducing conditions including temperatures of about 950° to 1250° C. and an essential absence of free or molecular oxygen to produce an elemental sulfur-containing thermal reduction effluent wherein the gas velocity in the thermal reduction zone is about 1 to 25 meters per second and the residence time of the sulfur dioxide-containing gases in the thermal reduction zone is about 0.1 to 4 seconds;

cooling the thermal reduction effluent to about 240° to 400° C.;

subjecting the cooled thermal reduction effluent to catalytic hydrolysis in the presence of a catalytically-effective amount of a hydrogenation and hydrolysis catalyst to hydrolyze carbon disulfide and carbonyl sulfide contained in the thermal reduction effluent to hydrogen sulfide and reduce at least part of the sulfur dioxide present in the thermal reduction effluent to hydrogen sulfide; and

cooling the hydrolyzed thermal reduction effluent to about 118° to 170° C. to condense and separate elemental surface from the gases.

4,117,101

PROCESS FOR REDUCTION OF SO_2

Joachim Fechner, Hennef; Siegward Fiebig, Cologne-Auweiler; Friedrich Fischer, Lang-Gons; Herbert Fischer, Lollar; Lars Hellmer, Widdersdorf; Konrad Riedel, Cologne; Adolf Stauffer, Pulheim, and Kuldip Sud, Weiden, all of Fed. Rep. of Germany, assignors to Davy Powergas GmbH, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 622,821, Oct. 16, 1975, abandoned, which is a continuation of Ser. No. 6 18,285, Sep. 30, 1975, abandoned. This application Mar. 14, 1977, Ser. No. 777,452

Int. Cl.[2] C01B *17/04*

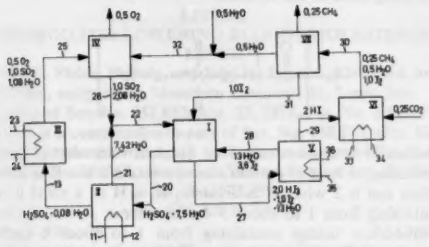
U.S. Cl. 423—569 **22 Claims**

1. A process for producing essentially carbon-free elemental sulfur from sulfur dioxide-containing gases having at least about 10 volume percent sulfur dioxide by thermal reduction using relatively moderate temperatures which comprises combusting hydrocarbon, in the essential absence of sulfur dioxide-containing gases, with an oxygen-containing gas, in an insufficient amount on a stoichiometric basis for complete combustion of the hydrocarbon, to provide a thermal reduction zone having reducing conditions including temperatures from about 950° to 1250° C. and pyrolysis of hydrocarbon to provide SO_2-reducing gas for thermally reducing sulfur dioxide to elemental sulfur; introducing the sulfur dioxide-containing gases into the thermal reduction zone downstream of the hydrocarbon combustion to thermally reduce the sulfur dioxide, with SO_2-reducing gas, in the relative absence of oxygen, and produce a reaction product containing elemental sulfur and sulfur compounds including carbonyl sulfide or carbon disulfide; catalytically contacting the reaction product under hydrogen sulfide-producing conditions including a temperature of about 200° to 460° C. to convert carbonyl sulfide or carbon disulfide to hydrogen sulfide which can be converted to additional amounts of elemental sulfur; and recovering elemental sulfur.

4,117,102
THERMOCHEMICAL PROCESS FOR PRODUCING METHANE AND OXYGEN FROM CARBON OXIDES AND WATER

Rudolf Schulten, Richterich, and Friedrich Behr, Gross Denkte, both of Germany, assignors to Rheinische Braunkohlenwerke AG, Cologne, Germany

Filed Apr. 28, 1977, Ser. No. 791,720
Claims priority, application Fed. Rep. of Germany, Apr. 30, 1976, 2619399
Int. Cl.² C01B *13/00*
U.S. Cl. 423—579 12 Claims



1. A recirculatory process for producing methane and oxygen which comprises:

(a) reacting sulphur dioxide with iodine and water in an exothermic reaction to form sulphuric acid and a polyiodide comprising a member selected from the group consisting of hydrogen triiodide and hydrogen triiodide hydrate,

(b) separating the resulting sulphuric acid from the reaction mixture formed in step (a),

(c) thermally concentrating and disposing the sulphuric acid separated in step (b) at increased temperature to form water, sulphur dioxide and oxygen,

(d) decomposing the polyiodide formed in step (a) to form iodine and gaseous hydrogen iodide,

(e) reacting the so formed gaseous hydrogen iodide with a carbon oxide selected from carbon monoxide, carbon dioxide and a mixture of carbon monoxide and carbon dioxide at an elevated temperature from 200° to 500° C. and at a pressure from 10 to 60 atmospheres to form methane and water, ps and in which the methane formed in step (e) and oxygen formed in step (c) are removed from the system and the remaining products of reaction formed in steps (a), (c), (d) and (e) are re-utilised in steps (a) to (e).

4,117,103
LITHIUM ION TRANSPORT COMPOSITIONS

Henry Y-P Hong, Westford, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed May 4, 1977, Ser. No. 793,801
Int. Cl.² C01G *17/00*; C01B *33/20*
U.S. Cl. 423—593 6 Claims

1. A crystalline compound which promotes fast lithium transport in a three dimensional network having the formula:

$$Li_{16-2x}D_x(GeO_4)_4$$

wherein D is a divalent cation and x is a number greater than zero and less than 4.

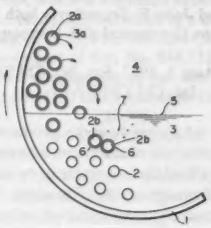
2. The compound of claim 1 of the formula:

$$Li_{14}Zn(GeO_4)_4$$

4,117,104
NOVEL LEAD MONOXIDE AND PROCESS FOR PREPARATION THEREOF

Yujiro Sugahara, Tokyo; Yoshibumi Noshi; Hiroyuki Naito, both of Tsuruoka; Mamoru Saito, Tsuruoka; Akira Takahashi, Tsuruoka, and Hisashi Tuchida, Tsuruoka, all of Japan, assignors to Mizusawa Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed May 30, 1977, Ser. No. 793,379
Claims priority, application United Kingdom, May 13, 1976, 19804/76
Int. Cl.² C01G *21/02*
U.S. Cl. 423—619 28 Claims



1. A process for the preparation of lead monoxide which comprises charging granules of metallic lead, a liquid medium and oxygen in a rotary mill, rotating the rotary mill under such conditions that at least parts of the metallic lead granules wetted with the liquid medium are located in the gas phase above the level of the liquid medium and friction is caused among the metallic granules through the liquid medium, to thereby form a dispersion of very fine particles of lead monoxide in the liquid medium, and separating the dispersion from the metallic lead granules.

25. A lead monoxide having a true density of 8.3 to 9.2 g/cc, an average particle size not larger than 0.2 μ, an infrared absorption peak at a wave number of 1400 to 1410 cm^{-1} and a chromic anhydride reactivity (RC) of at least 94%, said chromic anhydride reactivity (RC) being defined by the following formula:

$$RC\,(\%) = AC/TC \times 100$$

wherein AC denotes the quantitative analysis value (g) of CrO_3 in a product (lead chromate) obtained by reacting lead monoxide with chromic anhydride at a molar ratio of 1 : 1 in water in the absence of a catalyst and TC denotes a theoretical value (g) of CrO_3 to be contained in the product, namely the amount of chromic anhydride added.

4,117,105
PROCESS FOR PREPARING DISPERSIBLE BOEHMITE ALUMINA

Elliot P. Hertzenberg, Wilmington, Del.; Irwin Jerry Itzkovitch, Willowdale, and Ivan H. Joyce, Oakville, both of Canada, assignors to PQ Corporation, Valley Forge, Pa.

Filed Mar. 21, 1977, Ser. No. 779,441
Int. Cl.² C01F *7/02, 7/44*
U.S. Cl. 423—625 8 Claims

1. A process for preparing dispersible, colloidal sized particles of boehmite alumina, said boehmite alumina being characterized by a surface area of 35 to 250 m^2/g and dispersibility such that up to 25% by weight boehmite solids can be dispersed in water containing 0.01 to 0.5% HCl, said process comprising the steps of:

(a) calcining alumina trihydrate with a surface area of 0.2 to 15 m^2/g at temperatures between 200° and 800° C for a period of 2 to 17 hours, thereby increasing the surface area of the alumina to 250 to 800 m^2/g by partial dehydration;

(b) forming a slurry of said calcined alumina and water;

(c) autoclaving the slurry at a temperature between 140° and 200° C for a period of one-half to 6 hours, thereby achieving crystallization and rehydration of the alumina and producing a slurry of colloidal sized particles of boehmite and

(d) dewatering said slurry.

4,117,106

METHOD FOR PRODUCING BAYERITE

Larry L. Bendig, and John F. Scamehorn, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Aug. 1, 1977, Ser. No. 820,527
Int. Cl.² C01F 7/02
U.S. Cl. 423—630 **3 Claims**

1. A method for enhancing bayerite production during the low temperature hydrolysis of aluminum alkoxides comprising injecting aluminum alkoxides into water or an aqueous solution at a temperature of from about 100° F to about 160° F wherein said injection is carried out at an injection velocity equal to or greater than 100 feet per second as determined using the formula $V=F/\rho A$ wherein A is orifice area in square feet, ρ is density in pounds per cubic foot, and F is flow rate in pounds per second, by-products and adsorbed alcohols are removed, and bayerite is recovered without an ageing period.

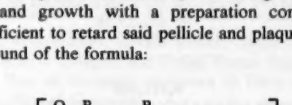
4,117,107

METHOD AND COMPOSITION FOR IMPROVING ORAL HYGIENE

Warren B. Shapiro, Randallstown, and Owen Rodney Blackburne, Baltimore, both of Md., assignors to Noxell Corporation, Baltimore, Md.

Filed Oct. 17, 1975, Ser. No. 623,277
The portion of the term of this patent subsequent to Sep. 26, 1995, has been disclaimed.
Int. Cl.² A61K 7/22, 7/16
U.S. Cl. 424—54 **38 Claims**

1. A method for retarding pellicle and plaque formation on teeth which comprises intermittently contacting sites of plaque formation and growth with a preparation comprising an amount sufficient to retard said pellicle and plaque formation of a compound of the formula:



wherein R is a monovalent or divalent hydrocarbyl group containing at least 14 carbon atoms, n is one when R is monovalent and is 2 when R is divalent; R_1 is H or an alkyl group containing from 1 to about 3 carbon atoms; A is a divalent hydrocarbon bridge containing from 1 to about 6 carbon atoms; and each R_2 individually is an alkyl group containing from 1 to about 5 carbon atoms; or both R_2 groups are interconnected to form a heterocyclic ring with the N atom to which they are attached and contains 5 to 6 members in the ring and being selected from the group consisting or morpholinyl, piperidinyl, pyrrolidinyl, and piperazinyl; or nontoxic, physiologically and orally acceptable salts of said compound; or mixtures thereof.

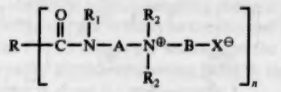
4,117,108

ORAL HYGIENE

Warren B. Shapiro, Randallstown, and Owen Rodney Blackburne, Baltimore, both of Md., assignors to Noxell Corporation, Baltimore, Md.

Continuation-in-part of Ser. No. 623,277, Oct. 17, 1975. This application Sep. 9, 1976, Ser. No. 721,746
Int. Cl.² A61K 7/22, 7/16
U.S. Cl. 424—54 **46 Claims**

1. A method for retarding pellicle and plaque formation on teeth which comprises intermittently contacting sites of plaque formation and growth with a preparation comprising an amount sufficient to retard said pellicle and plaque formation of a compound of the formula:



wherein R is a monovalent or divalent hydrocarbyl group containing at least 14 carbon atoms, *n* is one when R is monovalent and is 2 when R is divalent; R_1 is H or a alkyl group containing from 1 to about 3 carbon atoms; A is a divalent hydrocarbon bridge containing from 1 to about 6 carbon atoms; each R_2 individually is an alkyl group containing from 1 to about 5 carbon atoms; or both R_2 groups are interconnected to form a heterocyclic ring with the N atom to which they are attached and contains 5 to 6 members in the ring, and being selected from the group consisting of morpholinyl, piperidinyl, pyrrolidinyl, and piperazinyl; B is a divalent alkylene or alkylidene group containing 1 or 2 carbon atoms, and X is a carboxylate or sulfonate group; and further provided that B contains 2 carbon atoms when X is a carboxylate group; or nontoxic, physiologically and orally acceptable salts of said compound; or mixtures thereof.

4,117,109

DENTIFRICE PREPARATION

George K. Stookey, Noblesville, Ind., assignor to Indiana University Foundation, Bloomington, Ind.

Filed Jan. 22, 1976, Ser. No. 651,447
Int. Cl.² A61K 7/16, 7/18
U.S. Cl. 424—57 **4 Claims**

1. A paste type dentifrice preparation comprising:

from about 10 up to about 20%, by weight calcium pyrophosphate;

from about 8 up to about 15%, by weight, of an inert filler comprising low particle size silica; and

from about 0.5 to about 5.0% of at least one detergent.

4,117,110

SOLID AIR-IMPROVING COMPOSITION

Horst Hautmann, Neuburg, Donau, Fed. Rep. of Germany, assignor to Globol Werk GmbH, Neuburg, Fed. Rep. of Germany

Continuation of Ser. No. 623,118, Oct. 16, 1975, abandoned, which is a continuation-in-part of Ser. No. 458,463, Apr. 8, 1974, abandoned. This application Apr. 14, 1977, Ser. No. 787,532
Claims priority, application Fed. Rep. of Germany, Mar. 18, 1974, 2412900
Int. Cl.² A61L 13/00
U.S. Cl. 424—76 **12 Claims**

1. A solid molded air improving gel composition comprising:

(a) a carrier material consisting of sodium stearate in a concentration of about 5 to 30 percent by weight of said composition;

(b) water in an amount of from at least 2% required for complete gelling; up to not more than about 20% by weight of said composition;

(c) a volatile component comprising

(c_1) a liquid paraffin having at 20° C an evaporation number ranging from 8 to 1000 based on the evaporation number at 20° C of diethylether being equal to 1, said liquid paraffin having a concentration of about 30 to 80 percent by weight of said composition; and

(c_2) a volatile deodorant or odorant material in an amount of not more than 62%, based on the weight of said composition, whereby the solidification point of said composition is not less than about 40° C, being sufficient to effectively deodorize or odorize the air in a closed room of determined space.

4,117,111

METHOD FOR LOWERING BLOOD CHOLESTEROL LEVEL

Joseph E. Fields, Ballwin, and John H. Johnson, Kirkwood, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 353,832, Apr. 23, 1973, Pat. No. 3,923,972, which is a continuation-in-part of Ser. No. 188,577, Oct. 12, 1971, abandoned, which is a continuation-in-part of Ser. No. 789,081, Jan. 2, 1969, abandoned. This application Apr. 29, 1975, Ser. No. 572,799

Int. Cl.[2] A61K *31/74*

U.S. Cl. 424—78 **23 Claims**

1. A method of controlling blood cholesterol levels in a living animal body in need of such control which comprises orally administering to said animal body a pharmaceutically effective amount of material comprising a lipophilic polymer effective for such purpose and having recurring units of copolymer of (1) alpha-olefin of at least 10 carbon atoms selected from alkoxy-olefins, alkylcarboxyl olefins, or mixtures thereof, with (2) unsaturated carboxylic acids, or anhydrides, or the amides, esters, imides or salts thereof, or mixtures of the foregoing, said copolymer having a molecular weight in the range of from about 1,000 to about 1,000,000, and said pharmaceutically effective amount being sufficient to achieve such control.

4,117,112

VACCINE FOR PREVENTION OF FELINE LEUKEMIA

William Fleming Hoggan Jarrett; James Oswald Jarrett, and Lindsay Joan Mackey, all of Glasgow, Scotland, assignors to University of Glasgow, Glasgow, Scotland

Continuation-in-part of Ser. No. 668,110, Mar. 18, 1976, Pat. No. 4,034,081, which is a division of Ser. No. 505,625, Sep. 13, 1974, Pat. No. 3,966,907. This application May 19, 1977, Ser. No. 798,509

Claims priority, application United Kingdom, Sep. 18, 1973, 43642/73

Int. Cl.[2] A61K *39/12*

U.S. Cl. 424—89 **7 Claims**

1. A vaccine for the prevention of disease associated with feline leukemia virus which comprises an effective amount of adjuvant and about 10^5–10^7 feline lymphoblastoid cells chronically infected with feline leukemia virus and having viral associated antigen on their surface wherein the virus and cells are inactivated by chemical or physical means without destroying immunogenicity.

4,117,113

IMMUNOLOGICAL PREPARATIONS

Anthony Clifford Allison, Mill Hill, and Gregory Gregoriadis, Kenton, both of England, assignors to National Research Development Corporation, London, England

Continuation-in-part of Ser. No. 590,270, Jun. 25, 1975, Pat. No. 4,053,585. This application Aug. 22, 1977, Ser. No. 826,409

Claims priority, application United Kingdom, Jun. 25, 1974, 28131/74

Int. Cl.[2] A61K *39/12, 39/18*

U.S. Cl. 424—89 **14 Claims**

1. A pharmaceutical preparation for administration in vivo to effect immunization comprising an immunologically effective agent selected from viral antigens which agent is incorporated essentially entrapped in liposomes, said liposomes having a negative charge.

4,117,114

COMPOSITION AND METHOD OF TREATING BENIGN PROSTATIC HYPERTROPHY WITH HEPTAMYCIN

Harry W. Gordon, Bronx, N.Y., assignor to Schmid Laboratories, Inc., Little Falls, N.J.

Continuation of Ser. No. 584,607, Jun. 6, 1976, abandoned, continuation of Ser. No. 414,968, Nov. 23, 1978, Pat. No. 3,920,813, which is a division of Ser. No. 313,568, Dec. 8, 1972, Pat. No. 3,843,785, which is a division of Ser. No. 194,052, Oct. 29, 1971, Pat. No. 3,721,734, which is a division of Ser. No. 70,509, Sep. 8, 1970, Pat. No. 3,714,347, which is a continuation-in-part of Ser. No. 544,712, Apr. 25, 1966, abandoned, and a continuation of Ser. No. 623,847, Mar. 17, 1967, Pat. No. 3,584,118. This application Oct. 5, 1976, Ser. No. 729,786

Int. Cl.[2] H61K *35/00*

U.S. Cl. 424—115 **3 Claims**

1. A process for the treatment of prostatic hypertrophy in a large mammal afflicted with benign prostatic hypertrophy which comprises orally administering to said mammal an effective dose for treating prostatic hypertrophy of heptamycin.

4,117,115

TREATMENT OF CONJUNCTIVITIS WITH POWDERED ALUMINUM

Frank Hutchins, P.O. Box 9035, 67 Pinedale Rd., Asheville, N.C. 28805

Division of Ser. No. 771,645, Feb. 24, 1977. This application Oct. 7, 1977, Ser. No. 840,141

Int. Cl.[2] A61K *33/22, 33/06*

U.S. Cl. 424—148 **16 Claims**

1. A process for treating conjunctivitis in an animal which comprises topically administering to a diseased eye of the animal afflicted with conjunctivitis an amount of powdered aluminum sufficient to arrest and relieve the affliction.

4,117,116

METHOD FOR LOWERING THE VISCOSITY OF CERTAIN AGENTS

John D. Buehler, Fort Washington; Pravinchandra B. Shah, Willow Grove, both of Pa., and Robert S. Joslin, Northbrook, Ill., assignors to William H. Rorer, Inc., Fort Washington, Pa.

Continuation of Ser. No. 395,472, Sep. 10, 1973, abandoned. This application Mar. 31, 1975, Ser. No. 561,766

Int. Cl.[2] A61K *33/08*

U.S. Cl. 424—157 **6 Claims**

1. The method of lowering the viscosity of a commercially available aqueous antacid gel cake which is supplied as a stiff, putty-like, non-flowing, bulk mass to physically transform it to a flowable consistency which can be pumped through a pipe, said gel cake being selected from the group consisting of:

magnesium hydroxide,

aluminum hydroxide and

magnesium hydroxide and aluminum hydroxide mixtures, in which the antacid constitutes 25% to 35% w/w of the gel cake, which comprises mixing into said gel cake a fluidizing agent selected from the group consisting of:

acacia,

citric acid,

sodium citrate,

sodium lauryl sulfate and

dioctyl sodium sulfosuccinate, in which said fluidizing agent is added so that it amounts to from 0.1% to 4% of the final total mixture.

4,117,117
TRIDECAPEPTIDE HAVING GASTRIN EFFECT

Erich Wunsch, Tutzing, Germany, assignor to Max Planck-Gesellschaft zur Forderung der Wissenschaften, Gottingen, Germany

Filed Jun. 21, 1977, Ser. No. 808,517
Claims priority, application Fed. Rep. of Germany, Jun. 23, 1976, 2628006
Int. Cl.[2] A61K *37/00;* C07C *103/52*
U.S. Cl. 424—177 **15 Claims**

6. A composition containing L-leucyl-L-glutamyl-L-glutamyl-L-glutamyl-L-glutamyl-L-glutamyl-L-alanyl-L-tyrosylglycyl-L-tryptophyl-L-leucyl-L-asparagyl-L-phenylalanineamide and/or a pharmaceutically acceptable salt thereof.

7. Process wherein the composition of claim 6 is used to stimulate the HCl secretion of the stomach.

4,117,118
ORGANIC COMPOUNDS

Eugen Härri, Therwil, and Artur Rüegger, Bottmingen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Continuation-in-part of Ser. No. 721,836, Sep. 9, 1976, abandoned, which is a continuation-in-part of Ser. No. 604,941, Aug. 15, 1975, abandoned, which is a continuation-in-part of Ser. No. 528,474, Nov. 29, 1974, abandoned. This application Mar. 28, 1977, Ser. No. 781,722
Claims priority, application Switzerland, Apr. 9, 1976, 4527/76
Int. Cl.[2] A61K *37/00;* C07C *103/52*
U.S. Cl. 424—177 **16 Claims**

1. Antibiotic S7481/F-1 having the following characteristics, when an amorphous form:

U.V. spectrum [CH_3OH; c = 1.063 g/l; d = 0.01 cm] as shown in FIG. 1 of the accompanying drawings,

I.R. spectrum [CH_2Cl_2] as shown in FIG. 2 of the accompanying drawings,

Proton N.M.R. spectrum [90 MHz; $CDCl_3$] as shown in FIG. 3 of the accompanying drawings,

High resolution mass spectrum [ion acceleration 4kv; temperature ion source 290° C; pressure 5.10^{-6} mm Hg] peak of mass = m/e 1183.831 [± 0.004] corresponding to $C_{62}H_{109}N_{11}O_{11}$ recognisable as product of elimination of water from $C_{62}H_{111}N_{11}O_{12}$; and empirical formula $C_{62}H_{111}N_{11}O_{12}$; or antibiotic S7481/F-2 having the following characteristics, when in amorphous form:

U.V. spectrum [CH_3OH; c = 1.062 g/l; d = 0.01 cm] as shown in FIG. 4 of the accompanying drawings;

I.R. spectrum [CH_2Cl_2] as hown in FIG. 5 of the accompanying drawings;

Proton N.M.R. spectrum [90 MHz; $CDCl_3$] as shown in FIG. 6 of the accompanying drawings;

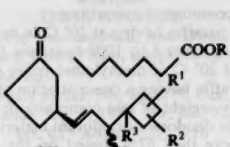
High resolution mass spectrum [ion acceleration 4 kv; ion source temperature 290° C; pressure 5.10^{-6} mm Hg] peak of mass m/e 1169.815 (± 0.006) corresponding to $C_{61}H_{107}N_{11}O_{11}$, the product of water elimination from $C_{61}H_{109}N_{11}O_{12}$; empirical formula $C_{61}H_{109}N_{11}O_{12}$.

4,117,119
15-CYCLOBUTYL-PROSTAGLANDINS

Masayasu Kurono, Mishimagun; Hisao Nakai, and Takashi Muryobayashi, both of Takatsuki, all of Japan, assignors to Ono Pharmaceutical Company, Osaka, Japan

Continuation-in-part of Ser. No. 557,437, Mar. 11, 1975, Pat. No. 4,045,468. This application May 6, 1977, Ser. No. 794,580
Int. Cl.[2] C07C *177/00;* A61K *31/19, 31/215*
U.S. Cl. 424—180 **4 Claims**

1. A compound of the formula:



wherein R represents a hydrogen atom or a straight- or branched- chain alkyl group containing from 1 to 12 carbon atoms, R^1 and R^2 represent hydrogen atoms and R_3 represents a straight- or branched- chain alkyl group containing from 1 to 6 carbon atoms and cyclodextrin clathrates of such acids and esters, and, when R represents a hydrogen atom, non-toxic salts thereof.

4,117,120
MEDICATION FOR HERPES SIMPLEX AND CANKER SORES

Gilbert J. Elderbaum, 380 Main St., Wakefield, Mass. 01880

Filed Feb. 11, 1977, Ser. No. 767,887
Int. Cl.[2] A61K *35/78*
U.S. Cl. 424—195 **1 Claim**

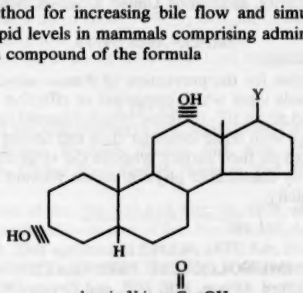
1. The method of treatment of herpes simplex virus, cold sores, lesions and blisters affecting mucous membranes of the mough comprising topical application of kelp to the affected area.

4,117,121
METHOD OF INCREASING BILE FLOW AND DECREASING LIPID LEVELS

Hugo Gallo-Torres, Livingston; James Guthrie Hamilton, Nutley, and Ann Clare Sullivan, Cedar Grove, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 22, 1977, Ser. No. 790,163
Int. Cl.[2] A61K *31/56*
U.S. Cl. 424—238 **23 Claims**

1. A method for increasing bile flow and simultaneously reducing lipid levels in mammals comprising administering to mammals a compound of the formula



wherein Y is $-C(=O)-OH$;

$-CH(CH_3)-(CH_2)_n-C(=O)-OH$; or

$-CH(CH_3)-CH_2-CH_2OH$;

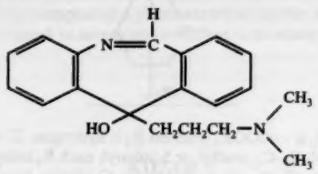
and n is an integer of from 0 to 1; or pharmaceutically acceptable salts thereof, said compound being administered in an effective amount to increase the bile flow and reduce the lipid level in said system.

4,117,122
11-AMINOALKYLMORPHANTHRIDIN-11-OLS

Jules Freedman, Cincinnati, Ohio, assignor to Richardson-Merrell Inc., Wilton, Conn.

Continuation-in-part of Ser. No. 526,722, Nov. 25, 1974, abandoned. This application Oct. 7, 1976, Ser. No. 730,310
Int. Cl.[2] A61K *31/635;* C07D *223/00*
U.S. Cl. 424—244 4 Claims

1. A pharmaceutical composition which is intended for use as an antidepressant which comprises an anti-depressive amount of a compound of the formula



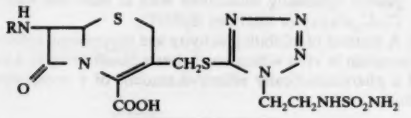
or a pharmaceutically acceptable acid addition salt thereof in combination with a major proportion of a pharmaceutical diluent.

4,117,123
7-ACYLAMINO-3-[1-(2-SULFAMIDOETHYL)TETRAZOL-5-YLTHIOMETHYL]-3-CEPHEM-4-CARBOXYLIC ACIDS

David Alan Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

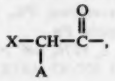
Filed Jun. 9, 1977, Ser. No. 805,197
Int. Cl.[2] A61K *31/545;* C07D *501/36*
U.S. Cl. 424—246 6 Claims

1. A compound of the formula:



in which:

R is an acyl group selected from the group consisting of:



where:

X is thienyl, furyl, phenyl or phenyl monosubstituted with hydroxy, hydroxymethyl, formamido or ureido;

A is NH_2, OH, COOH, SO_3H, or formoxyl or a nontoxic pharmaceutically acceptable salt thereof.

4. A pharmaceutical composition in dosage unit form having antibacterial activity comprising a pharmaceutical carrier and a chemical compound as defined in claim 1.

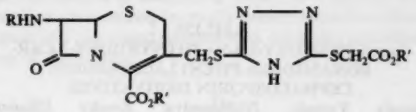
6. A method of treating bacterial infections comprising administering internally to an infected or susceptible human subject an antibacterially effective but nontoxic dose of a compound as claimed in claim 1.

4,117,124
7-ACYLAMINO-3-[[3-(CARBOXYMETHYL)THIO-1H-1,2,4-TRIAZOL-5-YL]THIOMETHYL]-3-CEPHEM-4-CARBOXYLIC ACIDS

David Alan Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

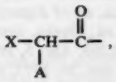
Filed Jun. 30, 1977, Ser. No. 811,642
Int. Cl.[2] A61K *31/545;* C07D *501/36*
U.S. Cl. 424—246 6 Claims

1. A compound of the formula:



in which:

R is an acyl group selected from the group consisting of:



where:

X is thienyl, furyl, phenyl or phenyl monosubstituted with hydroxy, hydroxymethyl, formamido or ureido;

A is NH_2, OH, COOH, SO_3H or, formoxyl

R′ is hydrogen or an alkali metal salt; or a nontoxic pharmaceutically acceptable salt thereof.

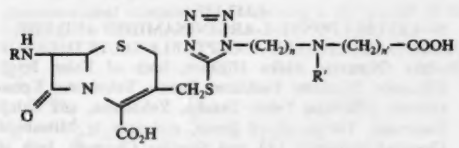
4. A pharmaceutical composition in dosage unit form having antibacterial activity comprising a pharmaceutical carrier and a chemical compound as defined in claim 1.

4,117,125
7-ACYLAMINO-3-[1-[2-(CARBOXYMETHYLAMINO]ETHYL) TETRAZOL-5-YLTHIOMETHYL]-3-CEPHEM-4-CARBOXYLIC ACIDS

David Alan Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

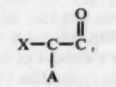
Filed Jun. 24, 1977, Ser. No. 809,585
Int. Cl.[2] A61K *31/545;* C07D *501/36*
U.S. Cl. 424—246 6 Claims

1. A compound of the formula:



in which:

R is an acyl group selected from the group consisting of:



where:

X is thienyl, furyl, phenyl or phenyl monosubstituted with hydroxy, hydroxyethyl, formamido, or ureido;

A is NH_2, OH, COOH, SO_3H, or formyloxy

R′ is hydrogen or lower alkyl;

n is 2 to 4;

n′ is 1 to 4;

or a nontoxic pharmaceutically acceptable salt thereof.

4. A pharmaceutical composition in dosage unit form having antibacterial activity comprising a pharmaceutical carrier and a chemical compound as defined in claim 1.

6. A method of treating bacterial infections comprising administering internally to an infected or susceptible human subject an antibacterially effective but nontoxic dose of a compound as claimed in claim 1.

4,117,126

7-(α-(4-HYDROXY-1,5-NAPHTHYRIDINE-3-CARBONAMIDO)-α-PHENYLACETAMIDO) CEPHALOSPORIN DERIVATIVES

Hirotada Yamada, Nishinomiya; Kosaku Okamura, Takarazuka; Hisao Tobiki, Kobe; Norihiko Tanno, Ashiya; Kozo Shimago, Toyonaka; Takenari Nakagome, Nishinomiya; Toshiaki Komatsu, Takarazuka; Akio Izawa, Kawanishi; Hiroshi Noguchi, Maebashi; Kenji Irie, Takarazuka, and Yasuko Eda, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

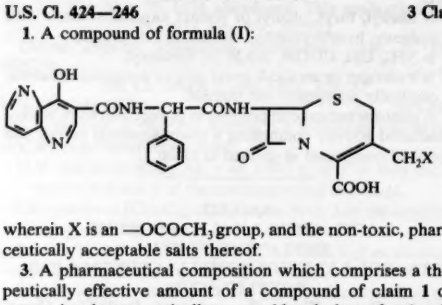
Division of Ser. No. 674,205, Apr. 5, 1976, Pat. No. 4,061,748. This application Sep. 26, 1977, Ser. No. 836,922

Claims priority, application Japan, Apr. 3, 1975, 50-41011

Int. Cl.[2] C07D *501/36*

U.S. Cl. 424—246 3 Claims

1. A compound of formula (I):



(I)

wherein X is an —$OCOCH_3$ group, and the non-toxic, pharmaceutically acceptable salts thereof.

3. A pharmaceutical composition which comprises a therapeutically effective amount of a compound of claim 1 or a non-toxic, pharmaceutically acceptable salt thereof and a pharmaceutically acceptable carrier or diluent.

4,117,127

N^2-ARYLSULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Shosuke Okamoto; Akiko Hijikata, both of Kobe; Ryoji Kikumoto, Machida; Yoshikuni Tamao, Yokohama; Kazuo Ohkubo, Machida; Tohru Tezuka, Yokohama, and Shinji Tonomura, Tokyo, all of Japan, assignors to Mitsubishi Chemical Industries Ltd. and Shosuke Okamoto, both of Tokyo, Japan

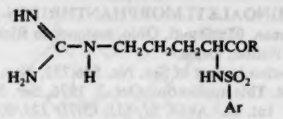
Division of Ser. No. 760,745, Jan. 19, 1977, Pat. No. 4,066,773, which is a continuation-in-part of Ser. No. 653,217, Jan. 28, 1976, Pat. No. 4,055,651, Ser. No. 713,486, Aug. 11, 1976, Pat. No. 4,073,914, Ser. No. 671,436, Mar. 29, 1976, Pat. No. 4,066,758, and Ser. No. 703,704, Jul. 8, 1976, Pat. No. 4,069,323, said Ser. No. 671,436, is a division of Ser. No. 622,390, Oct. 14, 1975, abandoned. This application Oct. 21, 1977, Ser. No. 844,188

Claims priority, application Japan, Nov. 8, 1974, 49-128774; Nov. 8, 1974, 49-128775; Nov. 29, 1974, 49-136695; Nov. 29, 1974, 49-136697; Feb. 25, 1975, 50-023268; Feb. 26, 1975, 50-023635; Mar. 5, 1975, 50-026768; Mar. 11, 1975, 50-029357; Mar. 11, 1975, 50-029358

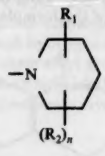
Int. Cl.[2] A61K *31/51;* C07D *417/12*

U.S. Cl. 424—247 4 Claims

1. An N^2-arylsulfonyl-L-argininamide having the formula



or a pharmaceutically acceptable salt thereof, wherein R is



wherein R_1 is —$COOR_3$ wherein R_3 is hydrogen, C_1–C_{10} alkyl, C_6–C_{10} aryl, C_7–C_{12} aralkyl or 5-indanyl; each R_2 independently is hydrogen, C_1-C_{10} alkyl, phenyl, C_1–C_5 alkoxy, C_2–C_6 alkoxycarbonyl, or carboxy; n is an integer of 1 to 4, R_1 is substituted into the piperidine ring at the 2 or 3 position; and R_2 is substituted into the piperidine ring at the 2, 3, 4, 5 or 6 position;

and Ar is 1, 2, 3, 4-tetrahydroquinolyl or 1, 2, 3, 4-tetrahydroisoquinolyl, either of which may be substituted with one or more groups selected from the group consisting of halo, nitro, cyano, hydroxy, C_1–C_{10} alkyl, C_1–C_{10} alkoxy, C_2–C_{20} dialkylamino, sulfoamino, carbamoyl, C_3–C_{10} N,N-dialkylcarbamoyl, amino, C_1–C_{10} alkylamino, mercapto, C_1–C_{10} alkylthio, C_7–C_{12} aralkyl, carboxy, C_2–C_{10} alkoxycarbomyl, C_2–C_{10} carboxyalkyl, C_1–C_{10} acylamino, C_2–C_{10} alkylcarbomyl, C_1–C_{10} hydroxyalkyl, C_1–C_{10} haloalkyl, oxo and phenyl optionally substituted with at least one hydroxy, C_1–C_5 alkoxy or mixtures thereof;

quinolyl, isoquinolyl, phthalozinyl, quinoxalinyl, quinazolinyl, cinnolinyl, acridinyl, phenazinyl, phenothiazinyl or phenoxazinyl, any of which may be substituted with one or more groups selected from the group consisting of halo, nitro, cyano, hydroxy, C_1–C_{10} alkyl, C_1–C_{10} alkoxy, C_2–C_{20} dialkylamino, sulfoamino, carbamoyl, C_3–C_{10} N,N-dialkyl-carbamoyl, amino, C_1–C_{10} alkylamino, mercapto, C_1–C_{10} alkylthio, C_7–C_{12} aralkyl, carboxyl, C_2–C_{10} alkoxycarbonyl, C_2–C_{10} carboxyalkyl, C_1–C_{10} acylamino, C_2-C_{10} alkylcarbonyl, C_1–C_{10} hydroxyalkyl, C_1–C_{10} haloalkyl and phenyl optionally substituted with at least one hydroxy, C_1–C_5 alkoxy or mixtures thereof.

4. A method of inhibiting activity and suppressing activation of thrombin in vivo which comprises administering to a mammal a pharmaceutically effective amount of a compound of claim 1.

4,117,128

SULFONYL BENZOFURANS AND BENZOTHIOPHENES HAVING CORONARY VASODILATOR ACTIVITY

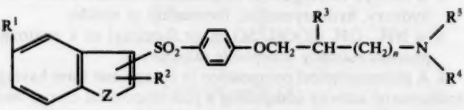
L. Martin Brenner, Havertown, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Aug. 3, 1976, Ser. No. 711,332

Int. Cl.[2] C07D *307/82;* A61K *31/34, 31/38*

U.S. Cl. 424—248.5 11 Claims

1. A compound of the formula:



or a pharmaceutically acceptable acid addition salt thereof, in which:

R^1 is hydrogen, halo or lower alkyl;

R^2 is lower alkyl, phenyl, benzyl, lower alkylphenyl, halo-

phenyl, trifluoromethylphenyl, lower alkylbenzyl, halobenzyl or trifluoromethylbenzyl;

R^3 is hydrogen or hydroxy;

R^4 is hydrogen or lower alkyl and R^5 is lower alkyl or R^4 and R^5 together with the nitrogen atom to which they are attached form a pyrrolidine, piperidine, N-(lower alkyl)-piperazine, morpholine or perhydroazepine ring;

n is 0 or 1 when R^3 is hydrogen and 1 when R^3 is hydroxy; and

Z is oxygen or sulfur.

10. A pharmaceutical composition having coronary vasodilator activity comprising a pharmaceutical carrier and a compound of claim **1** in an amount sufficient to produce said activity.

4,117,129

INDOLOBENZOXAZEPINES AS CNS DEPRESSANTS

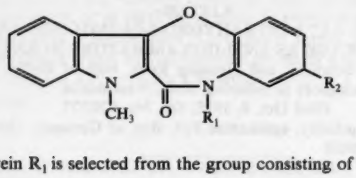
Richard E. Brown, Hanover, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 734,791, Oct. 22, 1976, Pat. No. 4,066,660, which is a division of Ser. No. 620,734, Oct. 8, 1975, Pat. No. 4,013,641. This application Sep. 8, 1977, Ser. No. 831,629

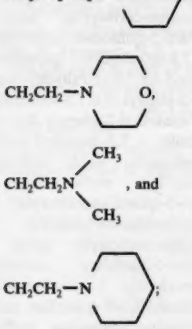
Int. Cl.[2] **A61K** *27/00, 31/40, 31/54, 31/495*

U.S. Cl. 424—248.57 **14 Claims**

1. A method of producing a central nervous system depressant activity in a mammal which comprises the administration of an effective CNS depressing amount of a compound or a pharmaceutical composition comprising a compound of the general formula:



wherein R_1 is selected from the group consisting of



wherein R_2 is selected from the group consisting of

—Cl, and

—H;

or the pharmaceutically acceptable salts thereof to said mammal.

4,117,130

METHOD FOR TREATING ANXIETY IN MAMMALS

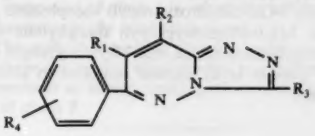
George Rodger Allen, Jr., Old Tappan, N.J.; John William Hanifin, Jr.; Daniel Bryan Moran, both of Suffern, N.Y., and Jay Donald Albright, Nanuet, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 735,475, Oct. 26, 1976, abandoned. This application Nov. 21, 1977, Ser. No. 853,724

Int. Cl.[2] **A61K** *31/495*

U.S. Cl. 424—250 **10 Claims**

1. The method of meliorating anxiety in a mammal which comprises administering internally to said mammal an effective amount of a compound selected from the group consisting of those of the formula:



wherein R_1, R_2, and R_3 are each individually selected from the group consisting of hydrogen and alkyl having up to 3 carbon atoms and R_4 is meta or para fluoro, chloro, bromo, cyano, trifluoromethyl, nitro or amino with the proviso that at least one of R_1 and R_2 is hydrogen; and the pharmacologically acceptable acid-addition salts thereof.

4,117,131

METHOD OF INHIBITING GASTRIC ACID SECRETIONS WITH 2-(4-PYRIMIDINYL)THIOACETAMIDES

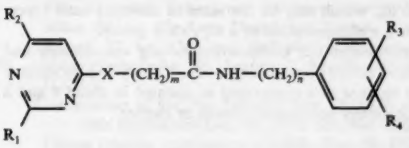
Charles F. Schwender, Dexter, Mich., and Russell E. Pike, Stanhope, N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 748,348, Dec. 7, 1976, abandoned. This application Sep. 12, 1977, Ser. No. 832,312

Int. Cl.[2] **A61K** *31/505;* **C07D** *239/00*

U.S. Cl. 424—251 **11 Claims**

1. A method of inhibiting gastric acid secretions in a mammal which comprises the administration to a mammal of a pharmaceutical composition comprising a compound of the formula:



wherein

R_1 and R_2 are selected from the group consisting of hydrogen, amino, alkylamino, hydroxyl, alkyl, and alkoxy; wherein

R_3 and R_4 are selected from the group consisting of: hydrogen, alkyl, alkoxy, amino, alkylamino, halogen, hydroxy, methylenedioxy, phenoxy, phenyl, alkylthio, trifluoromethyl, alkylsulfonyl, and alkylsulfinyl;

wherein *m* is 1 to 4 methylenes; wherein *n* is 0 to 4 methylenes; wherein X is O or S; wherein alkyl and alkoxy are defined as having 1 to 4 carbon atoms; and the pharmaceutically acceptable salts thereof in an amount sufficient to decrease gastric acid secretions in said mammal.

4,117,132

PROCESS FOR THE PRODUCTION OF STABILIZED PURE THEOPHYLLINE IN NEUTRAL, AQUEOUS SOLUTION

Adolf Seebach, Zurich, Switzerland, assignor to Dr. Adolf Seebach AG, Zurich, Switzerland

Filed Nov. 10, 1976, Ser. No. 740,672

Claims priority, application Switzerland, Apr. 2, 1976, 4152/76

Int. Cl.[2] A61K *31/52*

U.S. Cl. 424—253 **19 Claims**

1. A process of producing a pure, stable neutral aqueous solution of theophylline at a pH between 7 and 7.4 consisting essentially of adding pure theophylline to a neutral solution of a 7-hydroxypropyl theophylline selected from the group consisting of (a) 7-(2,3-dihydroxypropyl) theophylline and (b) a mixture of 7-(2,3-dihydroxypropyl) theophylline with 7-(2-hydroxypropyl) theophylline, the 7-hydroxypropyl theophylline being present in an amount sufficient to solubilize the theophylline.

4,117,133

VASODILATING CUANZINE HYDRAZIDES

Attilio Bonati, and Bruno Gabetta, both of Milan, Italy, assignors to Inverni Della Beffa S.p.A., Milan, Italy

Filed Oct. 20, 1976, Ser. No. 734,173

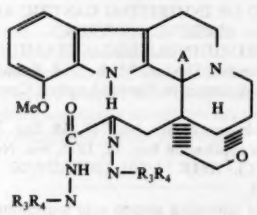
Claims priority, application United Kingdom, Oct. 28, 1975, 44441/75

Int. Cl.[2] C07D *519/04;* A61K *31/445*

U.S. Cl. 424—256 **11 Claims**

1. A compound having the general formula

III



wherein

A represents a hydrogen atom in the α- or β-configuration and

R_3 and R_4, which may be the same or different each represents a hydrogen atom or a C_{1-6} alkyl group.

5. A pharmaceutical composition having vasodilatory and hypotensive activity comprising a vasodilatory or hypotensive effective amount of a compound as claimed in claim 1 and a pharmaceutically acceptable diluent or carrier.

4,117,134

4,5-DIHYDRO-4,5-DIOXO-1H-1-BENZOPYRANO (2,3-B)-PYRIDINE-3-CARBOXYLIC ACIDS, SALTS AND ESTERS

David T. Connor, Ann Arbor, Mich., and Maximilian von Strandtmann, New Castle, Del., assignors to Warner-Lambert Company, Morris Plains, N.J.

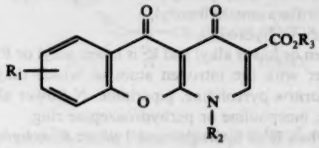
Filed Jun. 13, 1978, Ser. No. 806,026

Int. Cl.[2] C07D *405/04;* A61K *31/535*

U.S. Cl. 424—256 **8 Claims**

1. A compound of the formula VII:

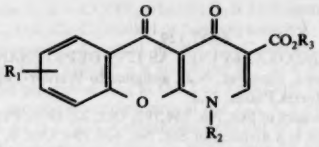
VII



wherein R_1 is hydrogen, lower alkyl, halogen, hydroxy or lower alkoxy; R_2 is hydrogen or lower alkyl; R_3 is hydrogen or lower alkyl; and the pharmaceutically acceptable, non-toxic salts thereof.

7. A pharmaceutical composition for alleviating allergic manifestations in mammals comprising an effective amount of a compound of the formula VII.

VII



wherein R_1 is hydrogen, lower alkyl, hydroxy or lower alkoxy; R_2 is hydrogen or lower alkyl; R_3 is hydrogen or lower alkyl; and the pharmaceutically acceptable, non-toxic salts thereof, together with an inert pharmaceutical carrier therefor.

4,117,135

NOVEL 5,6,7,8-TETRAHYDRO-5-QUINOLINES AND THEIR USE AS ANTI-INFLAMMATORY AGENTS

Eberhard Schröder, and Henning Koch, both of Berlin, Germany, assignors to Schering, A.G., West Berlin

Filed Oct. 8, 1975, Ser. No. 620,777

Claims priority, application Fed. Rep. of Germany, Oct. 11, 1974, 2449030

Int. Cl.[2] C07D *215/16;* A61K *31/47;* C07D *215/18, 215/20*

U.S. Cl. 424—258 **31 Claims**

1. A compound selected from the group consisting of 2-phenyl-5,6,7,8-tetrahydro-5-quinoline carbonitrile, 2-phenyl-5,6,7,8-tetrahydro-5-quinolinehydroxamic acid, 5-hydroxy-2-phenyl-5,6,7,8-tetrahydro-5-quinoline-carboxylic acid, 5-acetoxy-2-phenyl-5,6,7,8tetrahydro-5-quinoline-carboxylic acid, 5-amino-2-phenyl-5,6,7,8-tetrahydro-5-quinoline-carboxylic acid, 5-acetamino-2-phenyl-5,6,7,8-tetrahydro-5-quinoline-carboxylic acid, -5-methyl-2-phenyl-,5,6,7,8-tetrahydro-5-quinoline-carboxylic acid, 7,7-dimethyl-2-phenyl-,5,6,7,8-tetrahydro-5-quinoline carbonitrile, 7,7-dimethyl-2-phenyl-5,6,7,8-tetrahydro-5-quinolinecarboxylic acid, 2-(4-chlorophenyl)-5,6,7,8-tetrahydro-5-quinoline carbonitrile, 2-(4-chlorophenyl)-5,6,7,8-tetrahydro-5-quinolinecarboxylic acid, 2-(2-tolyl)-5,6,7,8-tetrahydro-5-quinoline-carbonitrile, 2-(2-tolyl)-5,6,7,8-tetrahydro-5-quinoline-carboxylic acid, 2-(4-methoxyphenyl-5,6,7,8-tetrahydro-5-quinoline carbonitrile, 2-(4-methoxyphenyl)- 5,6,7,8-tetrahydro- 5-quinolinecarboxylic acid, 2-cyclohexyl-5,6,7,8-tetrahydro-5-quinoline carbonitrile, 2-cyclohexyl-5,6,7,8-tetrahydro-5-quinoline carboxylic acid, 2-isobutyl-5,6,7,8-tetrahydro-5-quinoline carbonitrile, 2-isobutyl-5,6,7,8-tetrahydro-5-quinoline carboxylic acid, 3-chloro-2-cyclohexyl5,6,7,8-tetrahydro-5-quinoline carbonitrile, and 3-chloro-2-cyclohexyl-5,6,7,8-tetrahydro-5-quinolinecarboxylic acid.

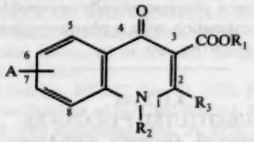
26. A method for the treatment of inflammation comprising administration to the affected patient an anti-inflammatorily effective amount of a compound of claim 1.

4,117,136
SYSTEMIC ANTIMICROBIAL QUINOLINES FOR PLANT DISEASE

Yoshio Hisada, Kawanishi; Kiyoto Maeda, Takarazuka, and Hideo Agui, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

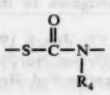
Filed Aug. 16, 1977, Ser. No. 825,115
Claims priority, application Japan, Aug. 19, 1976, 51-99322
Int. Cl.[2] A61K *31/47*
U.S. Cl. 424—258 **4 Claims**

1. A method for eradicating and preventing bacterially caused plant diseases which comprises applying to plants by foliar spraying or soil drenching or to seeds by dressing or immersing, as an effective component, 4(1H)-oxo-3-quinolinecarboxylic acids represented by the formula (I):



(I)

wherein A represents —OCH_2O—(attached at the 6- and 7-position) or



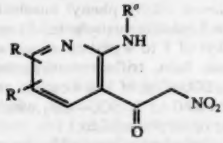
(attached at the 5- and 6-position), wherein R_4 represents a hydrogen atom or a (C_1–C_4)alkyl group; R_1 represents a hydrogen atom, a (C_1–C_4)alkyl group, an amino group, an ammonium group, or an alkali metal atom; R_2 represents a (C_1–C_4)alkyl group, a halogenated (C_1–C_4)alkyl group, a (C_1–C_4)hydroxyalkyl group, a (C_2–C_3)alkenyl group, or a (C_1–C_4)alkoxyl group; and R_3 represents a hydrogen atom or a (C_1–C_4)alkyl group.

4,117,137
2-AMINO-PYRIDYL NITROMETHYLKETONES AND 2-AMINO-PHENYL NITROMETHYLKETONES

Goetz E. Hardtmann, Morristown, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

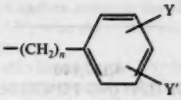
Continuation-in-part of Ser. No. 724,990, Sep. 20, 1976, abandoned. This application Jul. 6, 1977, Ser. No. 813,266
Int. Cl.[2] A61K *31/44*
U.S. Cl. 424—263 **45 Claims**

1. A compound selected from the group consisting of: a) a nitromethylketone in free base form of the formula:



wherein

R° is hydrogen, alkyl of 1 to 6 carbon atoms, alkenyl of 3 to 6 carbon atoms, alkynyl of 3 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, cycloalkylalkyl in which the cycloalkyl is of 3 to 6 carbon atoms and the alkyl portion is of 1 or 2 carbon atoms or



n is 0 or 1,

Y and Y' are independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms or trifluoromethyl, and

R and R' are independently hydrogen or alkyl of 1 to 4 carbon atoms, with the proviso that the unsaturation in any alkenyl or alkynyl is other than on the alpha carbon atom; and b) a salt form thereof.

2. A compound of claim 1 in which the salt form is formed by a pharmaceutically acceptable cation.

22. The method of treating allergic conditions due to histamine release comprising administering to a mammal in need of such treatment an allergy treating effective amount of a compound of claim 2.

4,117,138
PYRROLIDONECARBOXYLIC ACID THERAPEUTIC AGENTS

Albin J. Nelson, Ledyard, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 647,132, Jan. 7, 1976, Pat. No. 4,064,264. This application Sep. 16, 1977, Ser. No. 833,909
Int. Cl.[2] A61K *31/44, 31/455;* C07D *213/44*
U.S. Cl. 424—263 **4 Claims**

1. A compound selected from the group consisting of N-[N'-(2-pyridyl)-4'-benzamido]-2-pyrrolidone-4-carboxylic acid, a lower alkyl ester or unsubstituted amide derivative thereof, and a base salt of said acid with a pharmacologically acceptable cation.

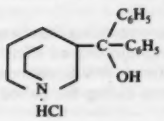
3. A method for combatting peptic ulcers in the treatment of a subject afflicted with said condition, which comprises administering to said subject a therapeutically-effective amount of a compound of claim 1.

4,117,139
MEDICATED COMPOUND FOR TREATING ALLERGIC DISEASES

Mikhail Davydovich Mashkovsky, Leningradsky prospekt, 75a, kv. 55; Leonid Nikolaevich Yakhontov, Nakhimovsky prospekt, 1, korpus 1, kv. 22; Andrei Dmitrievich Ado, Kotelnicheskaya naberezhnava, 1/15, kv. 295; Mikhail Emmanuilovich Kaminka, ulitsa Lobachevskogo, 12, kv. 29; Eva Evseevna Mikhlina, Kutuzovsky prospekt, 5/3, korpus 2, kv. 151; Valentina Yakovlevna Vorobieva, Novo-Alexeevskaya ulitsa, 5a, kv. 13; Anna Dmitrievna Yanina, Karachinovsky proezd, 22, kv. 132., and Nadezhda Andreevna Komarova, ulitsa Shabolovka, 65, korpus 2, kv. 86, all of Moscow, U.S.S.R.

Continuation of Ser. No. 525,633, Nov. 20, 1974, abandoned. This application Dec. 20, 1976, Ser. No. 752,127
Claims priority, application U.S.S.R., Dec. 18, 1973, 1979715
Int. Cl.[2] A61K *31/445*
U.S. Cl. 424—267 **8 Claims**

1. A method of alleviating histamine-induced symptoms in a patient in need thereof which comprises administering to said patient an antihistiminically effective amount of the active principle (quinuclidyl-3)-diphenylcarbinol hydrochloride of the formula:



4,117,140
BRONCHODILATING PIPERIDINOETHYL BENZOPYRANOPYRIDINONES

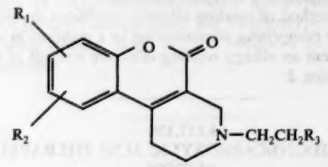
Richard E. Brown, 16 Ridge Dr., East Hanover, N.J. 07936; Chester Puchalski, 9 Locust Ave., Dover, N.J. 07801, and John Shavel, Jr., Yardley Pl., Mendham, N.J. 07945

Continuation-in-part of Ser. No. 743,839, Nov. 22, 1976, which is a continuation-in-part of Ser. No. 548,298, Feb. 10, 1975, abandoned. This application Jun. 30, 1977, Ser. No. 811,818

Int. Cl.[2] C07D *491/04*

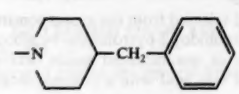
U.S. Cl. 424—267 6 Claims

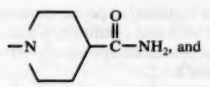
1. A compound of the formula:

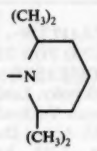


I

wherein R_1 and R_2 are selected from the group consisting of hydrogen, hydroxy, lower alkoxy or alkyl of 1 to 6 carbon atoms, or taken together R_1 and R_2 is a methylenedioxy group, and wherein R_3 is selected from the group consisting of:







and the pharmaceutical acceptable salts thereof.

6. A method of producing bronchodilation in a mammal which comprises the administration of an effective bronchodilating amount of a compound selected from the group consisting of 3-[2-(4-benzylpiperidino)ethyl]1,2,3,4-tetrahydro-8,9-dimethoxy-5H-[1]benzopyrano[3,4-c]pyridin-5-one and 1-[2-(1,2,3,4-tetrahydro-8,9-dimethoxy-5oxo-5H-[1]benzopyrano[3,4-c]pyridin-3-yl)ethyl]-4-piperidine-carboxamide dimaleate to said mammal.

4,117,141
METHOD OF INHIBITING FLEA-BITE ALLERGY

Dov Michaeli, 1431 8th Ave., San Francisco, Calif. 94122

Filed Feb. 18, 1977, Ser. No. 770,101

Int. Cl.[2] A61K *31/415*

U.S. Cl. 424—273 R 9 Claims

1. A method of hyposensitizing the allergic reaction in a host to flea-bite comprising injecting an effective amount of allantoin or allantoin derivatives subcutaneously into a host and repeating the injection during the period of exposure of the host to fleas.

4,117,142
DISUBSTITUTED TRIPHENYLMETHYLMIDAZOLES FOR TREATING MYCOTIC INFECTIONS

Karl Heinz Buchel; Erik Regel, and Manfred Plempel, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Germany

Continuation of Ser. No. 501,167, Aug. 28, 1974, abandoned, which is a division of Ser. No. 339,430, Mar. 8, 1973. This application Sep. 27, 1976, Ser. No. 726,568

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1972, 2213863

Int. Cl.[2] A61K *31/415*

U.S. Cl. 424—273 R 6 Claims

1. A pharmaceutical composition for treating mycotic infections in humans and animals which comprises an anti-mycotically effective amount of 1-(2,6-dichlorophenyl-diphenyl)-methyl-imidazole or a pharmaceutically acceptable non-toxic salt thereof, in combination with a pharmaceutically acceptable non-toxic inert carrier.

4,117,143
1-SUBSTITUTED PYRAZOLES

Eike Moller, Wuppertal, Germany; Karl-August Meng, deceased, late of Wuppertal, Germany (by Ilse Heide Frieda Meng, heir); Egbert Wehinger, Neviges, Germany; Harald Horstmann, Wuppertal, Germany, and Friedel Seuter, Neviges, Germany, assignors to Bayer Aktiengesellschaft, Germany

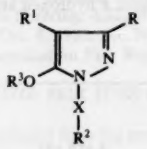
Division of Ser. No. 693,971, Jun. 8, 1976. This application Feb. 8, 1977, Ser. No. 766,684

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1975, 2526469

Int. Cl.[2] A61K *31/415, 31/445*

U.S. Cl. 424—273 P 23 Claims

1. A method of treating thromboses in humans and animals which comprises administering to a human or animal in need thereof an anti-thrombolitically effective amount a compound of the formula



wherein

R is hydrogen; lower alkyl; or trifluoromethyl;

R^1 is hydrogen or lower alkyl;

R^3 is R^6CO wherein

R^6 is lower alkyl; lower alkyl substituted by phenoxy; lower alkoxy; haloalkyl of 1 to 4 carbon atoms in the alkyl moiety and 1 to 3 halo atoms; cycloalkyl of 5 to 7 carbon atoms; lower alkylthio; haloalkoxy of 1 to 4 carbon atoms in the alkoxy moiety and 1 to 3 halo atoms; haloalkylthio of 1 to 4 carbon atoms in the alkyl moiety and 1 to 3 halo atoms; lower alkoxy(lower alkyl); mono- or di-lower alkylamino(lower alkyl); phenyl unsubstituted or substituted by 1 to 3 substituents selected from the group consisting of alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, halo, trifluoromethyl, trifluoromethoxy, nitro, cyano, SO_n-alkyl of 1 to 4 carbon atoms in the alkyl moiety and n is 0 to 2, SO_n—CF_3 wherein n is 0 to 2, carbonamido or sulphonamido;

X is ethylene, or ethylene wherein 1 hydrogen atoms on one or both of the carbon atoms is substituted by alkyl of 1 to 4 carbon atoms, linked to R^2 via an oxygen or sulphur atom; and

R^2 is aryl of 6 to 10 carbon atoms unsubstituted or substituted by 1 or 2 substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, halo, trifluoromethyl, trifluoromethoxy, cycloalkyl of 5 to 7 carbon

atoms, cycloalkenyl of 5 to 7 carbon atoms, nitro, cyano, carboxamido unsubstituted or substituted by 1 or 2 alkyl moieties of 1 to 4 carbon atoms, or by 2 alkylene moieties of 1 to 4 carbon atoms which together with the nitrogen atom form a 5- to 7-membered heterocyclic ring, sulphonamido unsubstituted or substituted by 1 or 2 alkyl moieties of 1 to 4 carbon atoms or by 2 alkylene moieties of 1 to 4 carbon atoms which together with the nitrogen atom form a 5- to 7-membered heterocyclic ring, and SO_n—(lower alkyl) wherein n is 0 to 2; or phenyl having fused thereto a saturated or unsaturated 5- to 7-membered isocyclic ring; in combination with a pharmaceutically acceptable carrier.

4,117,144

DERIVATIVES OF SUBSTITUTED ISOINDOLINES WITH EFFECT ON THE CENTRAL NERVOUS SYSTEM

Nils Åke Jönsson, Södertälje; Lembit Mikiver, Järna, and Pinchas Moses, Solna, all of Sweden, assignors to AB Kabi, Stockholm, Sweden

Division of Ser. No. 288,027, Sep. 11, 1972, Pat. No. 3,947,451, and a continuation of Ser. No. 670,782, Mar. 26, 1976, abandoned. This application Mar. 30, 1976, Ser. No. 671,759

Int. Cl.[2] A61K *31/40*

U.S. Cl. 424—274 **3 Claims**

1. The compound 2′-β-Dimethylaminoethyl-spiro (cyclohexane-1,3′-isoindoline)-1′-one.

4,117,145

1-SUBSTITUTED PYRAZOLES

Eike Möller, Wuppertal, Fed. Rep. of Germany; Karl-August Meng, deceased, late of Wuppertal, Fed. Rep. of Germany (by Ilse Freida Meng, legal representative); Egbert Wehinger, Neviges, Fed. Rep. of Germany; Harald Horstmann, Wuppertal, Fed. Rep. of Germany, and Friedel Seuter, Neviges, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany

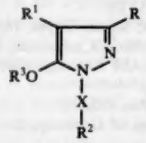
Division of Ser. No. 693,971, Jun. 8, 1976. This application Feb. 8, 1977, Ser. No. 766,715

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1975, 2526469

Int. Cl.[2] A61K *31/415, 31/445*

U.S. Cl. 424—273 P **46 Claims**

1. A pharmaceutical composition useful for effecting diuresis and saluresis in humans and animals and for treating hypertension and thromboses in humans and animals which comprises a diuretically effective amount, a saluretically effective amount, an anti-hypertensively effective amount or an anti-thrombotically effective amount of a compound of the formula



wherein

R is hydrogen; lower alkyl; or trifluoromethyl;

R^1 is hydrogen or lower alkyl;

R^3 is R^6CO wherein

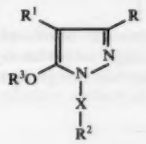
R^6 is lower alkyl; lower alkyl substituted by phenoxy; lower alkoxy; haloalkyl of 1 to 4 carbon atoms in the alkyl moiety and 1 to 3 halo atoms; cycloalkyl of 5 to 7 carbon atoms; lower alkylthio; haloalkoxy of 1 to 4 carbon atoms in the alkoxy moiety and 1 to 3 halo atoms; haloalkylthio of 1 to 4 carbon atoms in the alkyl moiety and 1 to 3 halo atoms; lower alkoxy (lower alkyl); mono- or di-lower alkylamino(lower alkyl); phenyl unsubstituted or substituted by 1 to 3 substituents selected from the group consisting of alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, halo, trifluoromethyl, trifluoromethoxy, nitro, cyano, SO_n-alkyl of 1 to 4 carbon atoms in the alkyl moiety and n is 0 to 2, SO_n-CF_3 wherein n is 0 to 2, carbonamido or sulphonamido;

X is ethylene, or ethylene wherein 1 hydrogen atoms on one or both of the carbon atoms is substituted by alkyl of 1 to 4 carbon atoms, linked to R^2 via an oxygen or sulphur atom; and

R^2 is aryl of 6 to 10 carbon atoms unsubstituted or substituted by 1 or 2 substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, halo, trifluoromethyl, trifluoromethoxy, cycloalkyl of 5 to 7 carbon atoms, cycloalkenyl of 5 to 7 carbon atoms, nitro, cyano, carboxamido unsubstituted or substituted by 1 or 2 alkyl moieties of 1 to 4 carbon atoms, or by 2 alkylene moieties of 1 to 4 carbon atoms which together with the nitrogen atom form a 5- to 7-membered heterocyclic ring, sulphonamido unsubstituted or substituted by 1 or 2 alkyl moieties of 1 to 4 carbon atoms or by 2 alkylene moieties of 1 to 4 carbon atoms which together with the nitrogen atom form a 5- to 7-membered heterocyclic ring, and SO_n- (lower alkyl) wherein n is 0 to 2; or phenyl having fused thereto a saturated or unsaturated 5- to 7-membered isocyclic ring;

in combination with a pharmaceutically acceptable carrier.

24. A method of effecting diuresis and saluresis in humans and animals and treating hypertension in humans and animals which comprises administering to a human or animal in need thereof a diuretically effective amount, a saluretically effective amount or- an anti-hypertensively effective amount of a compound of the formula



wherein

R is hydrogen; lower alkyl; or trifluoromethyl;

R^1 is hydrogen or lower alkyl;

R^3 is R^6CO wherein

R^6 is lower alkyl; lower alkyl substituted by phenoxy; lower alkoxy; haloalkyl of 1 to 4 carbon atoms in the alkyl moiety and 1 to 3 halo atoms; cycloalkyl of 5 to 7 carbon atoms; lower alkylthio; haloalkoxy of 1 to 4 carbon atoms in the alkoxy moiety and 1 to 3 halo atoms; haloalkylthio of 1 to 4 carbon atoms in the alkyl moiety and 1 to 3 halo atoms; lower alkoxy(lower alkyl); mono- or di-lower alkylamino(lower alkyl); phenyl unsubstituted or substituted by 1 to 3 substituents selected from the group consisting of alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, halo, trifluoromethyl, trifluoromethoxy, nitro, cyano, SO_n-alkyl of 1 to 4 carbon atoms in the alkyl moiety and n is 0 to 2, SO_n-CF_3 wherein n is 0 to 2, carbonamido or sulphonamido;

X is ethylene, or ethylene wherein 1 hydrogen atoms on one or both of the carbon atoms is substituted by alkyl of 1 to 4 carbon atoms, linked to R^2 via an oxygen or sulphur atom; and

R^2 is aryl of 6 to 10 carbon atoms unsubstituted or substituted by 1 or 2 substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, halo, trifluoromethyl, trifluoromethoxy, cycloalkyl of 5 to 7 carbon atoms, cycloalkenyl of 5 to 7 carbon atoms, nitro, cyano, carboxamido unsubstituted or substituted by 1 or 2 alkyl moieties of 1 to 4 carbon atoms, or by 2 alkylene moieties of 1 to 4 carbon atoms which together with the nitrogen atom form a 5- to 7-membered heterocyclic ring, sulphonamido unsubstituted or substituted by 1 or 2 alkyl moieties

of 1 to 4 carbon atoms or by 2 alkylene moieties of 1 to 4 carbon atoms which together with the nitrogen atom form a 5- to 7-membered heterocyclic ring, and SO_n- (lower alkyl) wherein n is 0 to 2; or phenyl having fused thereto a saturated or unsaturated 5- to 7-membered isocyclic ring;

in combination with a pharmaceutically acceptable carrier.

4,117,146

METHOD FOR TREATING DEPRESSION AND ANXIETY USING PHENYL HYDRAZO COMPOUNDS

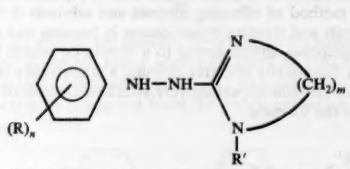
Abdulmuniem H. Abdallah, and Philip J. Shea, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 27, 1977, Ser. No. 810,348

Int. Cl.[2] A61K *31/415*

U.S. Cl. 424—273 R **14 Claims**

1. A method for alleviating symptoms of Central Nervous System depression and anxiety in a mammal suffering from depression and anxiety which comprises administering internally to said mammal a pychoactive amount of a compound or a pharmaceutically acceptable salt thereof having the formula



wherein R is chloro or fluoro; R′ is hydrogen or methyl; n is the integer one or two; and m is the integer two whereby the resulting heterocyclic ring including the two nitrogen atoms is imidazole.

4,117,147

FUNGICIDAL COMPOSITIONS AND PROCESSES

Margaret Claire Shephard, Maidenhead, and Roland Thomas Victor Fox, Wokingham, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Sep. 8, 1977, Ser. No. 831,670

Claims priority, application United Kingdom, Sep. 22, 1976, 39267/76

Int. Cl.[2] A61K *31/40*

U.S. Cl. 424—274 **3 Claims**

1. A process for combating the fungal disease *Rhizoctonia solani* which comprises treating plants, seeds or soil infested with the disease, or liable to such infestation, with an amount of 6-fluoroindole effective to control said fungus disease.

4,117,148

2,9-DIOXATRICYCLO [4,3,1,0,3,7] DECANE DERIVATIVES, PROCESSES FOR THEIR PREPARATION AND PHARMACEUTICAL COMPOSITIONS THEREOF

Peter Willibrord Thies, and Samuel David, both of Hannover, Germany, assignors to Kali-Chemie Pharma GmbH., Hannover, Germany

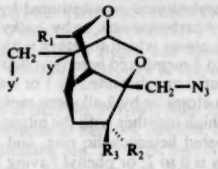
Continuation-in-part of Ser. No. 770,055, Feb. 18, 1977. This application Aug. 22, 1977, Ser. No. 826,681

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1977, 2730988

Int. Cl.[2] A61K *31/335*

U.S. Cl. 424—278 **38 Claims**

1. A compound selected from the group of 3-azidomethyl-2,9-dioxatricyclo [4,3,1,$0^{3,7}$] decanes of the formula I



(I)

wherein

R_1 represents alkyloxy containing 1 to 4 carbon atoms or benzyloxy;

one of R_2 and R_3 is hydrogen and the other represents hydroxy, carboxylic acyloxy, or carbamyloxy, or R_2 and R_3 jointly represent oxygen; and

y and y' each represent hydrogen or jointly form a bond.

33. A pharmaceutical composition for the treatment of pain comprising an analgesically active amount of at least one compound as defined in claim **1**.

35. A pharmaceutical composition for the treatment of anti-inflammatory disorders comprising an antiphlogistically active amount of at least one compound as defined by claim **1**.

37. A method of treatment of pains in larger mammals which comprises the step of administering to a larger mammal an analgesically active amount of a compound as defined in claim **1**.

38. A method of treatment of inflammatory disorders in larger mammals which comprises the step of administering to a larger mammal an antiphlogistically active amount of a compound as defined in claim **1**.

4,117,149

4-OXO-4H-BENZOPYRANS AS ANIMAL GROWTH PROMOTANTS

Robert John Bass, Birchington, England, assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 714,086, Aug. 13, 1976, abandoned. This application May 10, 1977, Ser. No. 795,652

Claims priority, application United Kingdom, Sep. 12, 1975, 37553/75

Int. Cl.[2] A61K *31/35*; C07D *311/02*

U.S. Cl. 424—283 **1 Claim**

1. A method of promoting growth or improving feed conversion efficiency in animals which comprises the oral administration to said animals of feed containing per ton 1 to 100 grams of 7-Hydroxy-3-(naphth-2-yl)-4-oxo-4H-benzopyran.

4,117,150

FURAN DERIVATIVES

Ernst-Heinrich Pommer, Limburgerhof; Sabine Thym, Heidelberg-Dossenheim, and Wolfgang Reuther, Ziegelhausen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

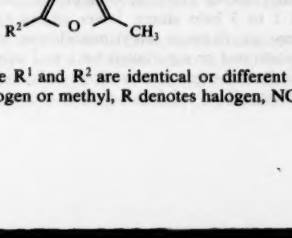
Filed Nov. 30, 1977, Ser. No. 855,889

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1977, 2703023

Int. Cl.[2] A01N *9/12*; C07D *307/68*

U.S. Cl. 424—285 **6 Claims**

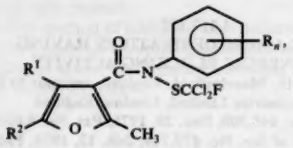
1. A furan derivative of the formula



where R^1 and R^2 are identical or different and each denotes hydrogen or methyl, R denotes halogen, NO_2, alkyl of from 1

to 4 carbon atoms, haloalkyl of from 1 to 4 carbon atoms, alkoxyl of from 1 to 4 carbon atoms, CN, $COOR^3$, alkylthio, phenyl or CF_3—S—, R^3 denoting alkyl of from 1 to 4 carbon atoms, and *n* denotes one of the integers 0, 1 and 2.

2. A process for the protection of wood against wood-destroying and wood-discoloring fungi, wherein the wood is treated with a fungicidally effective amount of a furan derivative of the formula



where R^1 and R^2 are identical or different and each denotes hydrogen or methyl, R denotes halogen, NO_2, alkyl of from 1 to 4 carbon atoms, haloalkyl of from 1 to 4 carbon atoms, alkoxyl of from 1 to 4 carbon atoms, CN, $COOR^3$, alkylthio, phenyl or CF_3—S—, R^3 denoting alkyl of from 1 to 4 carbon atoms, and *n* denotes one of the integers 0, 1 and 2.

4,117,151
THERAPEUTIC SULFONAMIDES

Marcel Descamps, Rosieres, and Charles Goldenberg, Brussels, both of Belgium, assignors to Labaz, Paris, France

Filed Mar. 2, 1977, Ser. No. 773,615

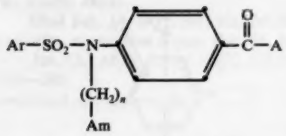
Claims priority, application United Kingdom, Mar. 8, 1976, 09253/76

Int. Cl.[2] C07D *307/81;* **A61K** *31/34*

U.S. Cl. 424—285 **10 Claims**

1. A sulfonamide derivative corresponding to the formula:

I



or a pharmaceutically acceptable acid addition salt thereof, wherein Ar represents phenyl, p-chlorophenyl, p-methylphenyl, p-methoxyphenyl, p-nitrophenyl, or pyridyl; Am represents a lower dialkylamino group, piperidino or 2-methylpiperazino; A represents 3-benzofuryl or 3-benzothienyl substituted in the 2-position by a branched- or straight-chain alkyl group containing from 1 to 4 carbon atoms and optionally substituted in the 5-position by a halogen atom or a lower alkoxy group, and *n* is the integer 2 or 3.

7. A pharmaceutical or veterinary composition useful in treating pathological conditions of the heart and particularly angina pectoris, containing an active principle an effective amount of at least one compound of formula I, or a pharmaceutically acceptable acid addition salt thereof, in association with a pharmaceutical excipient or carrier therefor.

4,117,152
OXOFURANOBENZOXEPIN-ACETIC ACIDS, PRECURSORS AND DERIVATIVES THEREOF

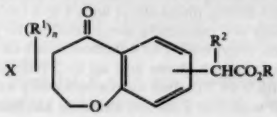
Arthur Raymond McFadden, East Brunswick, and Daniel Eugene Aultz, Middlesex, both of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.

Division of Ser. No. 607,926, Aug. 26, 1975, Pat. No. 4,025,640. This application Apr. 19, 1977, Ser. No. 788,786

Int. Cl.[2] A61K *31/34;* **C07D** *307/89*

U.S. Cl. 424—285 **12 Claims**

1. A compound of the formula



wherein X together with the carbon atoms to which it is attached is a furano ring structure; R is hydrogen or straight or branched chain alkyl of from 1 to 5 carbon atoms; R^1 is hydrogen or alkyl of 1 to 4 carbon atoms; R^2 is hydrogen or methyl; *n* is the integer 1, 2 or 3; and salts thereof prepared from pharmaceutically acceptable bases.

8. A pharmaceutical composition for treating inflammation and pain which comprises between about 0.5 and about 70 percent by weight of a compound defined in claim 1 as an essential active ingredient, the balance being a pharmaceutically acceptable carrier therefor.

4,117,153
SUBSTITUTED CARBAMIC ANHYDRIDES

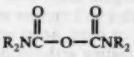
Edwin G. Wallace, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Jun. 3, 1977, Ser. No. 803,089

Int. Cl.[2] A01N *9/20;* **C07C** *101/00*

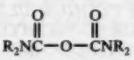
U.S. Cl. 424—286 **9 Claims**

1. A compound having the formula



wherein R is alkyl containing from 1 to 2 carbon atoms.

4. A method of controlling aphids comprising applying to said aphids, the habitat or feedstuff of said aphids an aphicidally effective amount of a compound having the formula



wherein R is alkyl containing from 1 to 2 carbon atoms.

4,117,154
PESTICIDALLY ACTIVE NOVEL OXIME-CARBAMATES OF FLUORINATED KETONES

Jorg Stetter, Wuppertal; Ingeborg Hammann, Cologne; Bernhard Homeyer, Leverkusen, and Wolfgang Behrenz, Overath, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

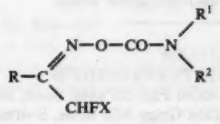
Filed Jul. 12, 1977, Ser. No. 815,045

Claims priority, application Fed. Rep. of Germany, Jul. 14, 1976, 2631522

Int. Cl.[2] A01N *9/12;* **C07C** *131/11, 121/38, 121/60*

U.S. Cl. 424—298 **9 Claims**

1. An oxime-carbamate of a fluorinated ketone of the formula



in which

X is hydrogen or fluorine.

R is alkyl with 1 to 6 carbon atoms optionally substituted by halogen, nitro, cyano, hydroxyl, —S-C_{1-4}-alkyl, —O-C_{1-4}-alkyl, —CO-O-C_{1-4}alkyl or —O-CO-C_{1-4}-alkyl; or phenyl optionally substituted by halogen, alkyl with 1 to 4

carbon atoms or halogenoalkyl with 1 or 2 carbon atoms and up to 5 halogen atoms; phenylalkyl with 1 to 4 carbon atoms in the alkyl moiety and optionally substituted in the phenyl moiety by halogen, alkyl with 1 to 4 carbon atoms or halogenoalkyl with 1 to 2 carbon atoms and up to 5 halogen atoms; or cycloalkyl with 5 to 7 carbon atoms optionally substituted by halogen, alkyl with 1 to 4 carbon atoms or halogenoalkyl with 1 or 2 carbon atoms and up to 5 halogen atoms;

R^1 is hydrogen, alkyl with 1 to 12 carbon atoms, alkenyl or alkynyl each with 2 to 4 carbon atoms, halogenoalkyl with up to 2 carbon atoms and up to 5 halogen atoms, halogenoalkenyl with up to 3 carbon atoms and up to 5 halogen atoms, alkoxyalkyl or alkythioalkyl with up to 2 carbon atoms in each alkyl moiety, or phenyl optionally substituted by halogen, alkyl with 1 to 4 carbon atoms, halogenoalkyl, halogenoalkoxy or halogenoalkylthio each with 1 to 2 carbon atoms and up to 5 halogen atoms, C_{1-2}-alkoxy, C_{1-2}-alkylthio phenyl, phenoxy, halophenyl, halophenoxy, nitro or cyano;

R^2 is any of R^1 or $—SR^3$,

R^3 is alkyl with 1 to 4 carbon atoms, halogenoalkyl with 1 to 2 carbon atoms and up to 5 halogen atoms, phenyl optionally substituted by halogen, alkyl with 1 or 2 carbon atoms or halogenoalkyl with 1 to 2 carbon atoms and up to 5 halogen atoms; alkoxycarbonyl with 1 to 4 carbon atoms in the alkoxy moiety; a radical identical to that to which the $—SR^3$ is bonded; or $—NR^4\text{-}SO_2\text{-}R^5$;

R^4 is alkyl with 1 to 4 carbon atoms;

R^5 is alkyl with 1 to 5 carbon atoms; dialkylamino with 1 to 4 carbon atoms in each alkyl moiety; or phenyl optionally substituted by halogen, alkyl with 1 to 2 carbon atoms, halogenoalkyl with 1 to 2 carbon atoms and up to 5 halogen atoms, cyano or nitro, or an acid addition salt.

8. A method of combating arthropods or nematodes which comprises applying to the arthropods or nematodes or to a habitat thereof, an arthropodicidally or nematicidally effective amount of a compound according to claim 1.

4,117,155
CONTROL OF *PYTHIUM ULTIMUM* WITH S-METHOXY- OR S-3-METHYLTHIOPHENYL N-ALKYLTHIOLCARBAMATES

Jay Kent Rinehart, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

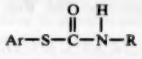
Division of Ser. No. 693,666, Jun. 7, 1976, Pat. No. 4,056,549. This application Oct. 19, 1977, Ser. No. 843,752

Int. Cl.[2] A01N *9/20*

U.S. Cl. 424—300 **4 Claims**

1. A method of controlling the deleterious effects of the plant pest *Pythium ultimum,* which comprises:

applying to the soil an effective amount which effectively controls the deleterious effects of said plant pest of a compound of the general formula:



wherein:

Ar is selected from the group consisting of 3-methoxyphenyl and 3-methylthiophenyl; and

R is an alkyl of from one to four carbon atoms.

4,117,156
ANTHELMINTIC PREPARATIONS

Werner Loewe, Zurich, and Heini Paul Striebel, Basel, both of Switzerland, assignors to Ciba-Geigy AG, Basle, Switzerland

Continuation-in-part of Ser. No. 704,899, Jul. 13, 1976, abandoned. This application Feb. 15, 1977, Ser. No. 768,804

Claims priority, application Switzerland, Jul. 18, 1975, 9438/75

Int. Cl.[2] A01N *9/18*

U.S. Cl. 424—302 **18 Claims**

1. An anthelminthic preparation for oral or rectal administration to warm-blooded animals, which preparations contain an anthelmintically effective amount of 4-(4-nitroanilino)-phenylisothiocyanate in solid form having a median of particle size of at most 10 μm in combination with a starch or in suspension in a member selected from the group consisting of water and triglycerides of C_8–C_{22} fatty acids.

4,117,157
ETHANOLAMINE DERIVATIVES HAVING β-ADRENERGIC BLOCKING ACTIVITY

Leslie Harold Smith, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

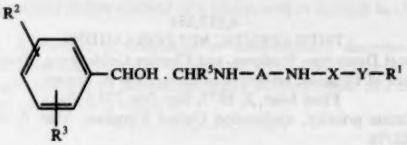
Division of Ser. No. 645,300, Dec. 29, 1975, Pat. No. 4,034,112, which is a division of Ser. No. 479,174, Jun. 13, 1974, Pat. No. 3,944,611. This application Apr. 14, 1977, Ser. No. 787,376

Claims priority, application United Kingdom, Jun. 22, 1973, 29679/73

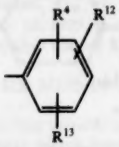
Int. Cl.[2] A61K *31/275;* C07C *127/00*

U.S. Cl. 424—304 **7 Claims**

1. An ethanolamine derivative selected from the group consisting of a compound of the formula:



wherein A is alkylene of from 2 to 6 carbon atoms, wherein R^1 is hydrogen or alkyl, alkenyl, halogenoalkyl or cycloalkyl each of up to 6 carbon atoms, or aryl of the formula:



wherein R^2, R^3, R^{12} and R^{13}, which may be the same or different, each is hydrogen, halogen, nitro, amino or cyano, or alkyl alkenyl, alkoxy, alkenyloxy, hydroxyalkyl, alkanoyl, acylamino or alkanesulphonamido each of up to 6 carbon atoms, wherein R^4 is hydrogen, hydroxy or carbamoyl, wherein R^5 is hydrogen or alkyl of up to 6 carbon atoms, wherein X is carbonyl and wherein Y is imino (—NH—); and an acid addition salt thereof.

5. A pharmaceutical composition having β-adrenergic blocking activity comprising as active ingredient an effective amount of at least one alkanolamine or an acid-addition salt thereof, claimed in claim 1, in association with a pharmaceutically-acceptable diluent or carrier therefor.

4,117,158
4-(MONOALKYLAMINO)BENZONITRILES USEFUL AS ANTI-ATHEROSCLEROTIC AGENTS

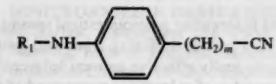
Robert Gordon Shepherd, South Nyack, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed Sep. 27, 1977, Ser. No. 836,946

Int. Cl.[2] A61K *31/275;* C07C *121/78*

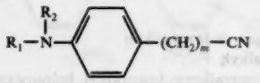
U.S. Cl. 424—304 **14 Claims**

1. A compound of the structural formula:



wherein R_1 is a straight chain or branched alkyl group of the formula C_nH_{2n+1} wherein n is an integer from 8 to 19, inclusive, and m is 1 or 2; and the pharmacologically acceptable acid-addition salts thereof.

10. The method of inhibiting atherosclerotic lesion development in a mammal comprising administering to said mammal an effective lesion development inhibiting amount of a compound of the formula:



wherein R_1 is a straight chain or branched alkyl group of the formula C_nH_{2n+1} wherein n is an integer from 8 to 19, inclusive; R_2 is hydrogen, alkyl having up to 3 carbon atoms, 1-(sodium sulfo)alkyl or alkanoyl having up to 6 carbon atoms; m is 0, 1 or 2; and the pharmaceutically acceptable acid-addition salts thereof.

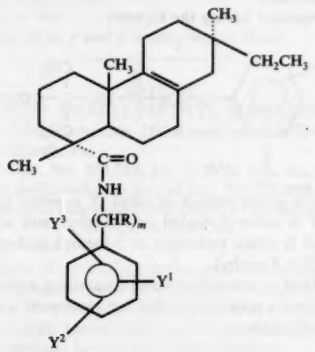
4,117,159

PHARMACEUTICALLY ACTIVE DELTAB-DIHYDROPIMARAMIDE DERIVATIVES

Hiromu Murai, Otsu; Yukio Fujita, Takatsuki; Tamiki Mori, Yokaichi; Hiroshi Enomoto, Kameoka, and Yoshiaki Yoshikuni, Kameoka, all of Japan, assignors to Nippon Shinyaku Co., Ltd., Kyoto, Japan

Filed Feb. 14, 1977, Ser. No. 768,052
Claims priority, application Japan, Feb. 26, 1976, 51-20870
Int. Cl.[2] A61K *31/24;* **C07C** *103/37*
U.S. Cl. 424—309 **7 Claims**

1. A compound of the formula:



wherein

R is hydrogen or lower alkyl;

m is 0 or 1; and each of Y^1, Y^2 and Y^3 independently of the other is hydrogen, lower alkyl, lower alkoxy, carboxy, carbo(lower alkoxy), hydroxy, trifluoromethyl or halogeno.

5. A serum cholesterol reducing and antiphlogistic pharmaceutical composition comprising an effective amount of a compound according to claim **1** in combination with a pharmaceutical carrier.

4,117,160

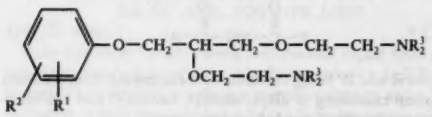
PHENOXY COMPOUNDS AND COMPOSITIONS

Francois Molnar, Valais; Suzanne Szabo, Vaud, and Peter Radanow Statkov, Geneva, all of Switzerland, assignors to Cermol S.A., Switzerland

Filed Jul. 8, 1977, Ser. No. 813,985
Claims priority, application Switzerland, Jul. 19, 1976, 9217/76
Int. Cl.[2] A01N *9/20;* **C07C** *93/06*
U.S. Cl. 424—316 **6 Claims**

1. A compound of the formula

I



in which

R^1 represents C_{1-3}alkyl, C_{2-3}alkenyl, C_{1-3}alkoxy, trifluoromethyl or halogen,

R^2 represents hydrogen, halogen, C_{1-3}alkyl, C_{2-3}alkenyl, C_{1-3}alkoxy group, and

R^3 represents a C_{1-3}alkyl group, or a salt thereof.

6. A method of providing a local anesthetic effect to a subject which comprises administering to said subject a local anesthetically amount of a compound of claim **1**.

4,117,161

METHOD OF PHARMACOLOGICALLY TREATING DRUG ADDICTION WITH ALPHA-METHYL-PARA-TYROSINE

Jose Pozuelo, 1463 Burlington, Cleveland Hts., Ohio 44118

Filed May 16, 1977, Ser. No. 797,372
Int. Cl.[2] A61K *31/195*
U.S. Cl. 424—319 **12 Claims**

1. A method of preventing alpha-methyl-para-tyrosine crystalluria in a human being who is being treated with a therapeutically effective amount of alpha-methyl-para-tyrosine, comprising:

administering to said human being treated with alpha-methyl-para-tyrosine an alkalinizing agent in an amount sufficient to cause the urine of said human being to have an alkaline pH.

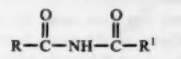
4,117,162

NEMATOCIDE CONTROL DIACYLIMIDE CONTROL DIACYLIMIDE COMPOSITIONS

Louis Schneider, Elizabeth, and David E. Graham, Westfield, both of N.J., assignors to GAF Corporation, New York, N.Y.

Filed Nov. 17, 1977, Ser. No. 852,513
Int. Cl.[2] A01N *9/20*
U.S. Cl. 424—320 **3 Claims**

1. A method of controlling nematode-infested soil which comprises applying to the nematode a nematocidally effective amount of a diacylimide compound having the formula:



wherein R and R^1 being the same or different are selected from the group consisting of alkyl, alkenyl, haloalkyl and haloalkenyl groups having from 1–5 carbon atoms.

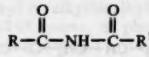
4,117,163

BROAD SPECTRUM FUNGICIDAL DIACYLIMIDE COMPOSITIONS

Louis Schneider, Elizabeth, and David E. Graham, Westfield, both of N.J., assignors to GAF Corporation, New York, N.Y.

Filed Nov. 17, 1977, Ser. No. 852,459
Int. Cl.[2] A01N *9/20*
U.S. Cl. 424—320 **2 Claims**

1. A method of controlling fungi which comprises applying thereto a fungicidally effective amount of a diacylimide compound having the formula:



wherein R and R^1 being the same or different are selected from the group consisting of alkyl, alkenyl, haloalkyl and haloalkenyl groups having from 1–5 carbon atoms.

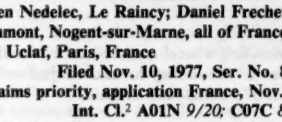
4,117,164

AMINOMETHYL-BENZOCYCLOHEPTENES AND METHOD OF USE

Lucien Nedelec, Le Raincy; Daniel Frechet, Paris, and Claude Dumont, Nogent-sur-Marne, all of France, assignors to Roussel Uclaf, Paris, France

Filed Nov. 10, 1977, Ser. No. 850,273
Claims priority, application France, Nov. 17, 1976, 76 34597
Int. Cl.[2] A01N *9/20;* **C07C** *87/28*
U.S. Cl. 424—330 **14 Claims**

1. A compound selected from the group consisting of 7-aminomethyl-benzocycloheptenes of the formula



wherein X is selected from the group consisting of nitro, amino, methoxy and hydroxy, R_1 is selected from the group consisting of hydrogen and alkyl of 1 to 5 carbon atoms and R_2 is alkyl of 1 to 5 carbon atoms and their non-toxic, pharmaceutically acceptable acid addition salts.

12. A method of relieving depression in warm-blooded animals comprising administering to warm-blooded animals an antidepressantly effective amount of at least one compound of claim **1**.

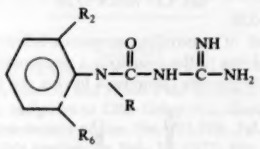
4,117,165

AMIDINOUREAS

Julius Diamond, Morris Plains, N.J., and Jerome J. Zalipsky, Melrose Park, Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.

Continuation-in-part of Ser. No. 379,627, Jul. 16, 1973, abandoned. This application Nov. 5, 1975, Ser. No. 628,857
Int. Cl.[2] A61K *31/17;* **C07C** *127/19*
U.S. Cl. 424—322 **58 Claims**

1. A compound of formula



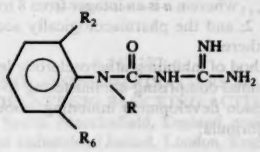
where:

R is hydrogen or loweralkyl;

R_2 is loweralkyl;

R_6 is halo, loweralkoxy, loweralkyl, haloloweralkyl, nitro or loweralkylsulfonyl; and the non-toxic acid addition salts thereof.

31. A method for treating gastrointestinal spasms comprising administering to a patient suffering from said gastrointestinal spasms a therapeutically effective amount between 0.25 mg/kg and 50 mg/kg per day of at least one compound of the formula:



where:

R is hydrogen or loweralkyl;

R_2 is loweralkyl;

R_6 is halo, loweralkoxy, loweralkyl, haloloweralkyl, nitro or loweralkylsulfonyl; and the non-toxic acid addition salts thereof.

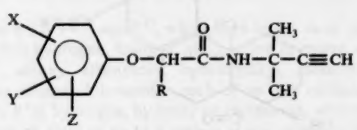
4,117,166

N-(1,1-DIMETHYL-2-PROPYNYL)-ALPHA-(SUBSTITUTED PHENOXY) ALKYLAMIDES AND THEIR USE AS MITICIDES

Don R. Baker, Orinda, and Francis H. Walker, Mill Valley, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

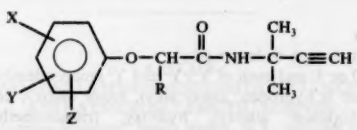
Continuation of Ser. No. 705,505, Jul. 15, 1976, abandoned, which is a continuation of Ser. No. 591,726, Jun. 30, 1975, abandoned. This application Nov. 14, 1977, Ser. No. 850,999
Int. Cl.[2] A01N *9/24;* **C07C** *103/75*
U.S. Cl. 424—324 **14 Claims**

1. A compound having the formula



wherein R is either methyl or ethyl; X is either chlorine or fluorine; Y is either 2-methyl or 3-methyl; and where Y is 2-methyl, Z is either hydrogen or 5-methyl; and where Y is 3-methyl, Z is 5-methyl.

8. A method of controlling mites comprising applying to the habitat thereof a miticidally effective amount of a compound having the formula



wherein R is either methyl or ethyl; X is either chlorine or fluorine; Y is either 2-methyl or 3-methyl; and where Y is 2-methyl, Z is either hydrogen or 5-methyl; and where Y is 3-methyl, Z is 5-methyl.

4,117,167

DINITROANILINE DERIVATIVES

Charles Brian Barlow, Camberley, and Peter Frank Hilary Freeman, Reading, both of England, assignors to Imperial Chemical Industries Limited, London, England

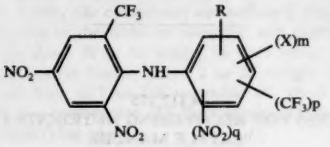
Filed Mar. 7, 1975, Ser. No. 556,421

Claims priority, application United Kingdom, Mar. 7, 1974, 10241/74; Apr. 11, 1974, 16171/74; Nov. 6, 1974, 47976/74

Int. Cl.[2] A01N *9/20*; C07C *87/54*

U.S. Cl. 424—330 10 Claims

1. A 2-anilino-3,5-dinitrobenzotrifluoride of the formula:



wherein R is hydrogen, methyl or methoxy;

X is halogen,

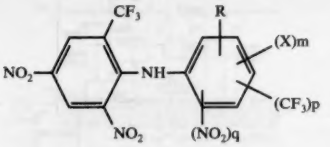
m is zero, one, when a further substitutent in addition to hydrogen is present on the ring, two or three,

p is zero, one or two,

q is zero or one

and the sum of *m*, *p* and *q* is one, two or three.

10. A method of combating insect and acarine pests of plants which comprises applying to the plants an insecticidally and acaricidally effective amount of a compound of the formula:



wherein R is hydrogen, methyl or methoxy;

X is halogen,

m is zero, one, two or three,

p is zero, one or two,

q is zero or one

and the sum of *m*, *p* and *q* is one, two or three.

4,117,168

ANTIFUNGAL DI(ARYL)METHYL ALKYL SULFONES

George G. Ecke, Barberton, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

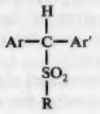
Division of Ser. No. 703,168, Jul. 7, 1976, Pat. No. 4,067,909, which is a continuation-in-part of Ser. No. 578,598, May 19, 1978, abandoned. This application Jan. 6, 1978, Ser. No. 867,418

Int. Cl.[2] A01N *9/14*

U.S. Cl. 424—337 20 Claims

1. A method of controlling the harmful effects of a fungus of the genus Piricularia upon a plant which comprises:

contacting the plant with a compound in an amount effective to control the harmful effects of the fungus upon the plant, the compound having the general formula:



wherein:

Ar is 4-chlorophenyl

Ar′ is an aryl selected from the group consisting of 4-chlorophenyl and 2-chlorophenyl, and

R is an alkyl of from one to four carbon atoms.

4,117,169

PROCESS FOR PRODUCING FERMENTED LIQUID FOOD PRODUCTS

Fumio Noda, Kamagaya; Keitaro Mogi, and Toshio Sakasai, both of Noda, all of Japan, assignors to Kikkoman Shoyu Co. Ltd., Japan

Filed Jun. 24, 1977, Ser. No. 809,701

Claims priority, application Japan, Jun. 30, 1976, 51-76541

Int. Cl.[2] A23L *1/20*, *1/10*, *1/238*

U.S. Cl. 426—7 9 Claims

1. In a process for producing a fermented liquid food product by fermenting a moromi which comprises a koji for the fermented liquid food product, a moromi substrate and a liquid including at least one member selected from the group consisting of brine, alcohol and water at a temperature of about 10° to about 40° C. for a time sufficient to produce the fermented liquid food product; the improvement wherein the fermentation is carried out in the presence of about 0.05 to about 10% by weight, based on the total weight of the koji and moromi substrate, of an added metal salt selected from the group consisting of potassium salts, sodium salts, calcium salts and magnesium salts of aliphatic carboxylic acids containing up to 4 carbon atoms.

4,117,170

SULFUR AS AN ANOREXIGENIC AGENT

Ray D. Washam, Arnold, Mo., assignor to Ralston Purina Company, St. Louis, Mo.

Filed Jul. 19, 1974, Ser. No. 489,972

Int. Cl.[2] A23K *1/10*, *1/175*

U.S. Cl. 426—72 6 Claims

1. A feed for swine comprising grain, protein, vitamin and mineral components, suitable for controlling feed intake to between about 2 to 8 pounds per head per day, further comprising as an added essential ingredient an amount of elemental sulfur effective to so control intake of the feed.

4,117,171

COLLAGEN COMPOSITIONS AND THE METHOD OF PREPARING THE SAME

Thomas Engel Higgins, Brookfield, Ill., assignor to Union Carbide Corporation, New York, N.Y.

Filed Oct. 14, 1976, Ser. No. 732,482

The portion of the term of this patent subsequent to Dec. 6, 1994, has been disclaimed.

Int. Cl.[2] A22C *13/00*

U.S. Cl. 426—140 19 Claims

6. A method of preparing a formable collagen composition suitable for use in preparing a shaped collagen structure which exhibits improved antiblocking characteristics including the steps of:

(a) preparing a viscous aqueous dispersion of non-collagenous fibers;

(b) preparing a comminuted pre-swollen collagen mass; and then

(c) admixing an amount of said aqueous fiber dispersion and an antiblock additive selected from the group consisting of fully esterified esters of polyhydric alcohols, mineral oil, and mixtures of the same with said pre-swollen collagen mass so that at least about 5% by weight of said antiblock additive and at least about 5% by weight of said non-collagenous fibers based on the solids content of said collagen admixture is incorporated in the collagen composition and then thoroughly mixing until a uniform admixture is obtained.

4,117,172
PROCESS FOR PREPARING SIMULATED SOFT CENTERED FRUITS

Noel James Bradshaw, Sharnbrook; David Savage, Folkestone, and Michael Edwin Sneath, Wellingborough, all of England, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 523,181, Nov. 12, 1974, abandoned, which is a division of Ser. No. 335,994, Feb. 26, 1973, abandoned. This application May 7, 1976, Ser. No. 684,328

Claims priority, application United Kingdom, Mar. 1, 1972, 9528/72

Int. Cl.² A23L *1/04*

U.S. Cl. 426—276 **20 Claims**

1. A process for preparing a fruit product consisting essentially of the steps of

(a) mixing fruit pulp or puree and an aqueous alginate or pectate sol to form a mixture;

(b) extruding the mixture to form drops of the mixture;

(c) treating the drops with an aqueous solution of an edible calcium salt to give the drops a skin of calcium alginate or pectate and a fluid or plastic core; and

(d) while the drops still have a fluid or plastic core, heating the treated drops to a temperature of 70° C to about 100° C to prevent full gelation of the sol in the interior of the drops said process thereby producing said fruit product with a firm outer skin and a softer interior.

4,117,173
USE OF GLUCOPYRANOSIDO-1,6-MANNITOL AS A SUGAR SUBSTITUTE

Hubert Schiweck, Obrigheim; Georg Steinle, Grünstadt; Lutz Müller; Wolfgang Gau, both of Wuppertal, and Mohammad Munir, Obrigheim, all of Germany, assignors to Suddeutsche Zucker-Aktiengesellschaft, Mannheim, Germany

Filed May 3, 1976, Ser. No. 682,674

Claims priority, application Fed. Rep. of Germany, May 6, 1975, 2520173

Int. Cl.² A23L *1/236*

U.S. Cl. 426—548 **5 Claims**

1. A sweetened food or beverage for human consumption comprising a foodstuff or beverage and glucopyranosido-1,6-mannitol in an amount effective to sweeten said foodstuff.

4,117,174
METHOD FOR PRODUCING TOFU-LIKE FOOD

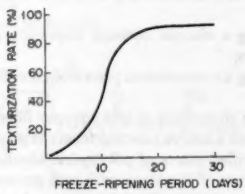
Takeo Tonouchi; Akio Tonouchi, both of Ina; Makoto Shiroshima; Yuichi Chimura, both of Nagano, and Kazuyoshi Ohkubo, Yamagata, all of Japan, assignors to Nagano-Ken Kohridofu Kogyo Cooperative Association, Nagano, Japan

Filed Mar. 11, 1977, Ser. No. 776,733

Claims priority, application Japan, Mar. 13, 1976, 51-27381

Int. Cl.² A23L *1/20*

U.S. Cl. 426—634 **6 Claims**



1. A method for producing a tofu-like food product comprising

preparing an aqueous slurry containing from 1/9 to ¼ by weight of crushed soybeans,

heating said slurry at between 60° C. and 100° C. for a period of time sufficient to thermally denature the soybean protein,

further crushing while dispersing said soybeans in said slurry to a level of subdivision sufficient to form a stable suspension,

rapidly freezing said suspension to between −50° C. and −10° C., and

ripening said suspension at between −10° C. and −3° C. for a period of time sufficient to texturize protein contained therein.

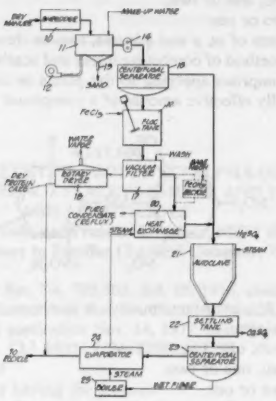
4,117,175
PROCESS FOR RECOVERING NUTRIENTS FROM CATTLE MANURE

Franklin C. Senior, Phoenix, Ariz., assignor to Feed Recycling Co., Ripley, Calif.

Filed Mar. 9, 1973, Ser. No. 339,892

Int. Cl.² A23J *3/00*

U.S. Cl. 426—657 **3 Claims**



1. A process for making a nutritious additive for cattle feed from cattle manure or cattle manure obtained from feed lots, which comprises:

shredding the manure;

mixing the shredded manure with water to form an aqueous slurry;

basifying the slurry;

centrifugally separating the liquid and solid portions of the slurry;

subjecting said liquid portion to the action of a chloride for precipitating protein constituents;

separating the precipitated protein constituents from the liquid carrier;

dehydrating the protein constituents to form a portion of the cattle feed additive;

acidifying the slurry solid portion to a pH below about 1.0;

increasing the temperature of the acid treated slurry to above 250° F. while maintaining the pressure thereof in the range of 25–75 psi;

agitating the heated pressurized slurry to rupture the solid portion and expose starches for conversion to mono-saccharides and amino sugars;

subjecting the hot slurry to the action of calcium oxide; and

condensing the hot slurry to form a syrup including sugars and proteins which is a further portion of the cattle feed additive.

4,117,176
FRUIT-FLAVORED CANDY PRODUCT

Paul G. Taylor, Pleasant Hill; Chung H. Son; Martha C. Hom, both of Concord; L. G. Williams, Martinez, all of Calif., and Ronald E. Steel, Wentzville, Mo., assignors to Del Monte Corporation, San Francisco, Calif.

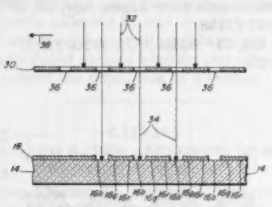
Filed Feb. 3, 1977, Ser. No. 765,302
Int. Cl.[2] A23G 3/00
U.S. Cl. 426—660 **11 Claims**

1. A candy product comprising a colored translucent substrate with opaque dehydrated fruit particles randomly distributed throughout the same, said candy product having a natural fruit taste, a taffy-like consistency and sufficient slipperiness to avoid sticking to the teeth on chewing, said candy product comprising about 30 to 60 weight % corn syrup, at least 5 weight % dextrin binder, about 2 to 25 weight % opaque dehydrated fruit, at least 1% vegetable oil, about 2.5 to 13 weight % of a combination of 6-hydroxy alcohol and glycerin, and an emulsifying agent.

4,117,177
LASER LITHOGRAPHY OF THIN FILM RESINATES

John D. Schlafer, Wayland, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Sep. 13, 1976, Ser. No. 723,003
Int. Cl.[2] B05D 3/06, 5/06
U.S. Cl. 427—53 **7 Claims**



1. In a method of manufacturing a color cathode ray tube in which an image screen is deposited on a glass faceplate and consists of a plurality of sets of elemental screen areas which areas individually include a phosphor material for emitting light of one of three primary colors and a light filter disposed between the phosphor material and the glass faceplate which is predominantly transmissive to light emitted by its associated phosphor material but substantially nontransmissive to the remaining two primary colors, and areas adjacent to the elemental screen areas which include more than one light filter, an improved method for forming the light filters which comprises:

(a) applying a first thin film of a metallic resinate to the faceplate, the first thin film having an inorganic oxide colorant of a first of the three primary colors in a vehicle of organic character which volatilizes upon firing to a predetermined temperature;

(b) directing a laser beam of light to the elemental screen areas of the image screen corresponding to the second and third primary colors, the absorption of the laser light by the first thin film or by the glass faceplate adjacent to the film creating localized liquefaction of the first film, the fluid, in response to being acted upon by forces of surface tension and rapidly volatilizing residual solvents in the first thin film, withdrawing from the elemental screen areas for the second and third primary colors;

(c) heating the first thin film by an amount which is effective to raise the energy threshold at which liquefaction occurs but ineffective to volatilize the organic material;

(d) applying a second thin film of a metallic resinate to the first thin film and to the faceplate adjacent to the holes, the second film having an inorganic oxide colorant of a second of the three primary colors in a vehicle of organic character which volatilizes upon firing to a predetermined temperature;

(e) directing a laser beam of light to the elemental screen areas of the image screen corresponding to the first and the third primary colors, the absorption of the laser light by the second thin film creating localized liquefaction of the second film without liquefying the first film due to its raised energy threshold, the fluid withdrawing from the elemental screen areas for the first and third primary colors in response to being acted upon by forces of surface tension and rapidly volatilizing residual solvents in the second thin film;

(f) heating the second thin film by an amount which is effective to raise the energy threshold at which liquefaction occurs but ineffective to volatilize the organic material;

(g) applying a third thin film of a metallic resinate to the second thin film and to the first thin film adjacent to the holes in the second thin film, the third thin film having an inorganic oxide colorant of the third of the three primary colors in a vehicle of organic character which volatilizes upon firing to a predetermined temperature:

(h) directing a laser beam of light to the elemental screen areas of the image screen corresponding to the first and second primary colors, the absorption of the laser light by the third thin film creating localized liquefaction of the third thin film without liquefying the second or first thin films due to their raised energy thresholds, the fluid withdrawing from the elemental screen areas for the first and second primary colors in response to being acted upon the forces of surface tension and rapidly volatilizing solvents in the third film: and

(i) heating the entire first, second, and third thin films having holes formed therein to volatilize the organic material to form the light filters on the elemental screen areas for the primary colors and the adjacent areas, the light filter for each primary color being disposed on the elemental screen areas corresponding to that primary color and being absent from the elemental screen areas corresponding to the other two primary colors.

4,117,178
PHENOLIC ANTIOXIDANTS FOR NON-POLYMERIC HALOGEN COMPOUNDS DURING IMPREGNATION OF STYRENE POLYMER PARTICLES

Walter O. Pillar, Monroeville, Pa., assignor to ARCO Polymers, Inc., Philadelphia, Pa.

Continuation-in-part of Ser. No. 689,026, May 24, 1976, abandoned. This application Nov. 7, 1977, Ser. No. 848,971
Int. Cl.[2] C08J 9/22
U.S. Cl. 521—60 **7 Claims**

1. In a process for making styrene polymer particles less flammable by impregnating the polymer particles by heating in aqueous suspension in the presence of a non-polymeric organic halogen compound and a blowing agent at temperatures between 100° C. and 125° C., the improvement comprising adding, prior to heating for the impregnation, about 0.001 to 0.40 percent by weight based on polymer particles of a hindered phenolic antioxidant consisting essentially of an alkylated phenol where said alkyl groups contain from 3 to 20 carbon atoms and at least one such alkyl group is in the position ortho to the hydroxy group of the phenol, whereby the polymer molecular weight is not degraded during the aqueous impregnation process.

4,117,179

OXIDATION CORROSION RESISTANT SUPERALLOYS AND COATINGS

Melvin R. Jackson, and John R. Rairden, III, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 4, 1976, Ser. No. 738,649
Int. Cl.[2] B32B *15/04, 15/20*
U.S. Cl. 427—405 8 Claims

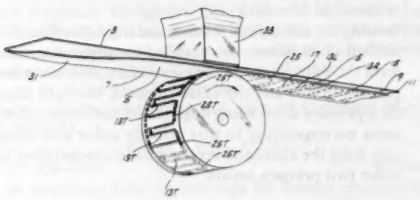
1. A method of improving the high temperature oxidation and corrosion resistance and preventing loss of strength of a carbide containing superalloy body, said body containing a carbide reinforcing phase, comprising steps of: (a) coating the superalloy body with a composition consisting essentially of chromium, aluminum, carbon and at least one element selected from iron, cobalt, or nickel, subject to the proviso that the coatings contain an amount of carbon (1) sufficient to saturate any solid state phases of the coating composition, (2) sufficient to essentially equilibrate the chemical potential of carbon in the coating with that in the substrate with minimum interaction, and (3) insufficient to form substantial quantities of carbides in the coating composition.

4,117,180

DRAPERY PLEATING TAPE AND ITS MANUFACTURE

Kenneth J. DeWoskin, Ann Arbor, Mich., assignor to Beltx Corporation, Barnhart, Mo.

Filed Mar. 25, 1977, Ser. No. 781,184
Int. Cl.[2] B32B *7/04, 3/00*
U.S. Cl. 428—35 2 Claims



1. A drapery pleating tape comprising two layers of thermoplastic fabric joined along one longitudinal edge of the tape,

said layers being thermoplastically sealed together at intervals spaced longitudinally of the tape on pairs of lines of seal extending transversely of the tape,

the two lines of seal of each said pair being spaced one from the other longitudinally of the tape but being closely adjacent one another thereby to define therebetween a narrow elongate pocket closed at its end at said one longitudinal edge of the tape and open at its other end adjacent the outer longitudinal edge of the tape for reception of a pin of a drapery hook,

one of said lines of seal of each pair constituting a left side seal and the other a right side seal for the respective pocket,

said layers also being thermoplastically sealed together at intervals spaced longitudinally of the tape on lines of seal extending transversely of the tape in each section of the tape intermediate successive pockets,

each of said intermediate lines of seal being located generally midway between the right side seal of the pocket at the left thereof and the left side seal of the pocket at the right thereof and dividing the respective section of the tape into two panels,

said left and right side pocket seals and said intermediate seals forming lines of fold for pleating the tape with the said two panels of each said section of the tape forming a pleat, said layers further being thermoplastically sealed together on a line of seal extending longitudinally of the tape adjacent said one longitudinal edge of the tape, said line of seal having portions extending between the right side seal of the pocket at the left of each section and the left side seal of the pocket at the right of the section and pocket end portions between the left and right side seals of the pockets,

and said layers further being thermoplastically sealed together on a line of seal adjacent the other longitudinal edge of the tape interrupted at the pockets and forming lines of seal extending longitudinally of the tape on each section of the tape between the right side seal of the pocket at the left of said section and the left side seal of the pocket at the right of said section,

said intermediate lines of seal extending from one of said longitudinal lines of seal to the other,

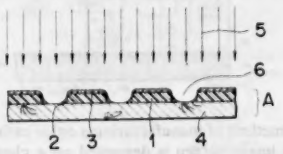
said longitudinal lines of seal forming stiffening means for said panels.

4,117,181

DECORATIVE LAMINATED STRUCTURES AND METHOD OF MAKING THE SAME

Kazuto Minami, Tokyo; Norihiko Tsukui, Higashikurume, and Tsunehiko Imamoto, Funabashi, all of Japan, assignors to Dai Nippon Printing Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 352,423, Apr. 19, 1973, abandoned.
This application Jul. 7, 1975, Ser. No. 593,517
Claims priority, application Japan, Apr. 20, 1972, 47-39141; Apr. 20, 1972, 47-52168
Int. Cl.[2] B32B *3/24, 3/30, 31/26*
U.S. Cl. 428—138 38 Claims



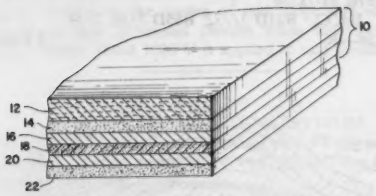
1. A decorative laminated structure having a pattern of concaves and convexes, at least one of said concaves having an opening at its bottom portion, and which consists essentially of a base sheet, a heat-shrinkable resin sheet, a picture layer having a plurality of heat-sensitive picture areas formed of a heat-sensitive ink composition and contiguous and adhered to said heat-shrinkable resin sheet said heat-shrinkable resin sheet having formed on the surface thereof concave portions, at least one of said concave portions having an opening at its bottom, said concave portions corresponding to said heat-sensitive picture areas of the picture layer.

13. A method of making a decorative laminated structure having a predetermined surface pattern of convexes and concaves, at least one of said concaves being perforated, said concaves corresponding to picture areas of said laminated structure of a heat-sensitive ink composition containing a heat-absorbing coloring agent; and comprising printing a predetermined pattern of heat-sensitive picture areas on a surface of a base sheet, said heat-sensitive picture areas being a heat-sensitive ink composition containing a heat-absorbing coloring agent; adhering the thus printed surface of the base sheet to a heat-shrinkable resin sheet to form an integral composite material; and irradiating the resultant composite material with an infrared or near infrared heat ray for a sufficient time such that heat energy is preferentially absorbed by said heat-sensitive ink composition causing said heat shrinkable resin sheet to shrink locally and form said concaves at areas corresponding to said heat-sensitive picture areas and causing at least one of said concaves to perforate.

4,117,182
HEAT RELEASE LAYER FOR DECALCOMANIAS

Ray Andrews, Washington, Pa., assignor to Commercial Decal, Inc., Mount Vernon, N.Y.

Filed Dec. 23, 1976, Ser. No. 753,926
Int. Cl.[2] B32B *3/00*
U.S. Cl. 428—201 31 Claims



1. A heat release decalcomania comprising a backing sheet, a heat release layer disposed on said backing sheet, a design layer disposed on said heat release layer and a heat activatable adhesive layer disposed on said design layer, said heat activatable adhesive layer capable of burning without the deposition of a residue, said heat release layer comprising a normally solid straight chain, primary aliphatic oxyalkylated alcohol.

15. A method of forming a heat release decalcomania which comprises applying a heat release layer to a backing sheet, applying a design layer to said heat release layer, and applying a heat activatable adhesive to said design layer, said heat release layer comprising a normally solid straight chain primary aliphatic oxyalkylated alcohol wherein said adhesive is capable of burning without the deposition of a residue.

4,117,183
STARCH-COATED PAPER AND GYPSUM WALLBOARD PREPARED THEREWITH

William J. Long, Chicago, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Continuation-in-part of Ser. No. 491,097, Jul. 23, 1974, Pat. No. 4,051,291, which is a continuation of Ser. No. 221,324, Jan. 27, 1972, abandoned. This application Feb. 18, 1977, Ser. No. 770,149
Int. Cl.[2] B32B *7/14;* B05D *5/00;* B32B *31/12;* C09J *7/02*
U.S. Cl. 428—201 60 Claims

1. A process for producing a starch-coated paper cover sheet having a bond liner and being suitable for use in manufacturing gypsum wallboard, which comprises:
(a) preparing a coating composition comprising water, non-migratory raw starch, and finely particulate calcium sulfate, and
(b) applying said coating composition on the surface of said bond liner in a pattern having said coating composition at limited areas of said bond liner while leaving substantial areas free of said composition.

16. A starch-coated paper cover sheet having a bond liner and being suitable for use in manufacturing gypsum wallboard, said bond liner having a coating composition on the surface thereof in a pattern having said coating composition at limited areas of said bond liner while leaving substantial areas free of said composition, said coating composition comprising water, non-migratory raw starch, and finely particulate calcium sulfate.

31. A process for producing gypsum wallboard comprising the following steps:
(a) providing at least one paper cover sheet having a bond liner and applying a coating of a non-migratory raw starch adhesive composition to provide a pattern having said starch adhesive composition at limited areas of said bond liner while leaving substantial areas free of said adhesive composition, said adhesive composition comprising water, starch and finely particulate calcium sulfate, and
(b) casting an aqueous slurry of calcium sulfate hemihydrate on said paper cover sheet over said bond liner with the water from said aqueous slurry establishing wet bonding between said slurry and the uncoated portions of said bond liner, and
(c) setting said slurry to form a core and setting said starch adhesive composition to establish an adhesive bond between said core and said paper cover sheet at the limited areas containing said starch adhesive.

46. Gypsum wallboard comprising:
(a) a core comprising rehydrated calcium sulfate hemihydrate, and
(b) a cover sheet affixed to each surface of said core comprising:
(1) a bond liner having a coating composition thereon comprising non-migratory raw starch and finely particulate calcium sulfate, said coating composition being present in a pattern having said coating composition at limited areas of said bond liner while leaving substantial areas free of said starch adhesive composition, said coating composition providing an adhesive bond between said core and said paper cover sheets at the limited areas containing said starch adhesive.

4,117,184
ABSORBENT FILMS AND LAMINATES

Robert E. Erickson, Midland, and Richard M. Krajewski, St. Louis, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 693,260, Jun. 7, 1976, abandoned. This application Jun. 23, 1977, Ser. No. 809,501
Int. Cl.[2] A61F *13/18;* B32B *27/06, 27/10, 27/12*
U.S. Cl. 428—224 25 Claims

1. A water swellable aerated film which is characterized by being rapidly wetted and swelled by water which comprises a lightly crosslinked alkali metal carboxylic polyelectrolyte having a density ranging from about 1.1 grams per cubic centimeter to about 0.3 grams per cc and a water absorbency rate of not greater than 60 seconds.

9. A water swellable aerated laminate which comprises one or more layers of the film of claim 1 on wicking substrates consisting of woven fabrics, non-woven fiber mats, or polymeric foams.

10. A water swellable aerated laminate which comprises one or more layers of the film of claim 1 on non-wicking substrates consisting of polymer films or papers.

14. A method for making the aerated film of claim 1 which comprises the steps of
(1) mechanically aerating a solution so as to introduce greater than 8% by weight of air wherein said solution has about 10 to about 25% by weight solids and about 75 to about 90% by weight of a solvent consisting of water, lower alcohols, or mixtures thereof wherein the solids comprise
(a) about 75 to about 99.5% of an alkali metal carboxylic polyelectrolyte, and
(b) about 0.5 to about 5.0% of a polyfunctional or difunctional crosslinking agent that is reactive with carboxylate groups,
(2) casting a wet film of said solution on a moving impervious support having a release surface, and

(3) heating the film to a temperature range from about 30° C to about 175° C to crosslink and remove substantially all the solvent.

4,117,185

BONDED INORGANIC AND FIBROUS MATERIAL BUILDING PRODUCT

Peter Gerald Cummins, Hastings; Bernard Sinton, Horsham, and Michael George Miller, Cranleigh, all of England, assignors to Redland Claddings Limited, England

Filed Nov. 4, 1976, Ser. No. 739,001

Claims priority, application United Kingdom, Jun. 3, 1976, 23009/76

Int. Cl.[2] B32B *5/16, 17/04*

U.S. Cl. 428—241 **6 Claims**

1. A method of manufacturing a building product comprising the steps of mixing together a mineral filler, glass fiber and a polyester resin into a mixture, forming said mixture into an uncured formed solid mass and applying a film of fluoroplastic material having one side treated for adhereability and the other side heat sealable or releasable, to at least one face of the unsecured solid mass with said one side in contact with said face, and pressing said film into contact with said face during heat curing of the resin in a mold.

2. A building product manufactured by the method of claim 1.

4,117,186

BUTYL/RESIN BLEND LATEX USED TO COAT POLYPROPYLENE FABRICS

Charles P. O'Farrell, Clark; Paul L. Malloy, Westfield, and Francis M. Thompson, White House Station, all of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 609,811, Sep. 2, 1975, abandoned, which is a continuation of Ser. No. 482,246, Jun. 24, 1974, abandoned. This application Feb. 8, 1977, Ser. No. 766,704

Int. Cl.[2] B32B *25/08, 25/10, 25/18, 27/32*

U.S. Cl. 428—265 **3 Claims**

1. A woven polypropylene fabric having adhered thereto a coating consisting essentially of a latex of butyl rubber and an unhydrogenated aliphatic petroleum hydrocarbon resin prepared from a coemulsified solution blend of said rubber and resin, wherein the weight ratio of rubber to resin is about 4:1 to 0.8:1 and wherein said resin has an aniline point greater than 100° C.

4,117,187

PREMOISTENED FLUSHABLE WIPER

James William Adams, Schofield, and Orville Harold Reinke, Oshkosh, both of Wis., assignors to American Can Company, Greenwich, Conn.

Filed Dec. 29, 1976, Ser. No. 755,195

Int. Cl.[2] B32B *27/00*

U.S. Cl. 428—286 **10 Claims**

1. A premoistened wiper having high initial wet strength and lower wet strength when immersed in a substantially neutral or alkaline liquid to allow for flushability, comprising:

(a) a non-woven web of fibrous materials;

(b) an adhesive binder distributed through said web bonding together the fibrous material of said web, said binder consisting esentially of an acid insoluble-alkali soluble acidic polymer which is resistant in acid liquid to weakening of the bonding between the fibers of said web;

(c) a wetting liquid in contact with said bonded web having an acid pH which is safe for external use on the human body; and

(d) alkali metal ions distributed through said web and available for association with said acidic polymer.

4,117,188

LAPPED SEAM CAN

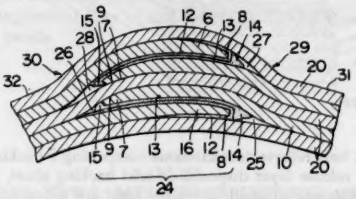
Yuzo Takahashi; Yoshimi Wazima; Akira Nakada; Yasuyuki Tanaka; Katsumi Nagai; Nobuo Takahashi; Hiroshi Matsuda; Eizi Aizawa, and Shiro Oyama, all of Iwatsuki, Japan, assignors to Hokkai Can Co. Ltd., Tokyo, Japan

Filed Mar. 25, 1977, Ser. No. 781,520

Claims priority, application Japan, May 17, 1976, 51-56383; Jun. 17, 1976, 51-71336

Int. Cl.[2] B21D *51/32;* **B65D** *7/36, 7/44*

U.S. Cl. 428—36 **5 Claims**



1. A lapped seam can having the opposite end portions of the can blank joined together with organic adhesive films and a double seam portion comprising:

a first inclined surfaced end portion of said blank terminating in an end face the thickness of which is about one-third of the original thickness of the can blank;

a first organic adhesive film covering the inner and outer surfaces of said first end portion including the end face;

a second end portion of said blank having an end face;

a second organic adhesive film stuck onto the inner surface of said second end portion of the can blank coming outside of said first end portion at the lapped seam;

said first organic adhesive film stuck onto the outer surface of said inner end of the can blank joined to said second organic adhesive film;

said second adhesive film forming a raised portion on one end thereof and coupled to the end face of said inner end portion to form an inclined surface continuous to said inclined surface of said first end portion;

said second adhesive film forming a raised portion on the other end thereof and coupled to the end face of said outer end portion of the can blank;

said double-seam portion having a sealing compound interposed in voids formed between said two end portions of the can blank when double-seamed;

said voids also being filled up with said adhesive film layers;

the opposite sides of the double-seamed lapped seam portion forming slack curved surfaces continuous to the double-seamed ring portion.

4,117,189

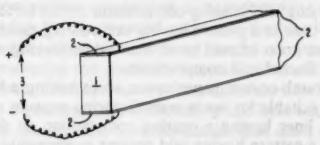
ELECTRICALLY CURABLE, ELASTOMERIC SEALING STRIP

Henry Joseph Stinger, Devon, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 16, 1977, Ser. No. 833,894

Int. Cl.[2] B32B *15/02, 15/08, 25/02*

U.S. Cl. 428—323 **9 Claims**



1. An uncured elastomeric sealing strip, which can be cured

in place, said sealing strip being made of a composition consisting essentially of chlorosulfonated polyethylene filled with furnace carbon black having an average particle size of about 10–30 nm in diameter and containing an effective amount of a curing agent, the proportion of the carbon black being at most about 80 parts by weight per 100 parts of chlorosulfonated polyethylene; said strip being in direct contact along substantially its entire length with two parallel, metallic electricity conductors, said conductors being substantially symmetrically spaced relative to the center of said strip; said strip being curable by heat generated therein when sufficient electric voltage below about 1000 V is applied to said conductors.

4,117,190
MAGNETIC RECORDING MEDIUM

Goro Akashi; Osamu Suzuki, and Masaaki Fujiyama, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Continuation-in-part of Ser. No. 370,260, Jun. 15, 1973, abandoned, which is a continuation of Ser. No. 164,042, Jul. 19, 1971, abandoned, which is a continuation of Ser. No. 766,640, Oct. 10, 1968, abandoned. This application Oct. 21, 1974, Ser. No. 516,315

Claims priority, application Japan, Oct. 11, 1967, 42-65268

Int. Cl. H01f *10/06*

U.S. Cl. 428—325 **21 Claims**

1. In an endless magnetic recording tape comprising a support, a magnetizable layer provided on one side of said support and a graphite anti-abrasion layer provided on the opposite side of said support from said magnetizable layer, the improvement comprising said anti-abrasion graphite layer consisting essentially of, dispersed in 20 to 50 parts by weight of a binder, 100 parts by weight of graphite and 5 to 15 parts by weight of a finely divided powder having a particle size of less than 10 microns and Moh's hardness of greater than 2 whereby the anti-abrasion properties of said magnetic recording medium are improved.

4,117,191
COMPOSITE SILICATE PIGMENT

Frederick L. Kurrle, Laurel, Md., assignor to Westvaco Corporation, New York, N.Y.

Division of Ser. No. 668,436, Mar. 19, 1976, Pat. No. 4,026,721. This application Mar. 2, 1977, Ser. No. 773,745

Int. Cl.² B32B *5/16*

U.S. Cl. 428—330 **7 Claims**

1. Paper comprising cellulosic pulp fibers and the addition of sufficient filler material to improve the optical properties of the pulp fibers, the improvement which comprises as the filler material a composite white pigment comprising a clay pigment component having a platelet type structure, said platelets having planar surfaces, and a metal silicate pigment component in the form of spherical particles of an alkaline earth metal silicate precipitated on the planar surfaces of the clay platelets, said metal silicate component comprising from about 10–90% by weight of the total composite pigment.

4,117,192
DEFORMABLE RETROREFLECTIVE PAVEMENT-MARKING SHEET MATERIAL

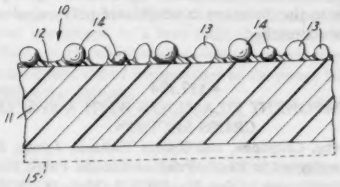
Jens L. Jorgensen, Anoka, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation of Ser. No. 658,283, Feb. 17, 1976, abandoned. This application Aug. 18, 1977, Ser. No. 825,691

Int. Cl.² B32B *5/16*

U.S. Cl. 428—337 **6 Claims**

1. Pavement-marking sheet material comprising a base film that is about one-fourth millimeter or more thick, includes a polymer, an extender resin, and particulate fillers, and exhibits deformability and reduced elasticity such that if retroreflective elements were pressed directly against the base film under the pressure of wheeled road traffic, they would become fully embedded in the base film; a thin support film adhered to one surface of the base film; and a scattering of glass microspheres arranged in a monolayer partially embedded and strongly adhered in the support film and partially exposed out of the support film, said support film being less thick than the average radius of said glass microspheres, and being less thick but more



elastic than the base film, whereby the support film with said glass microspheres resists embedment into said base film during passage of wheeled road traffic over the sheet material and returns closely to its original shape after the road traffic has completed its passage over the sheet material.

4,117,193
ANTISTATIC, LOW TEMPERATURE HEAT SEALABLE POLYPROPYLENE COMPOSITE FILM AND PROCESS FOR PRODUCTION THEREOF

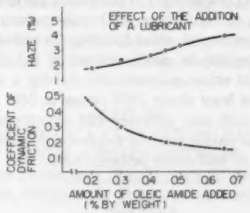
Mikio Tsuchiya, Suita; Takashi Kawamura, Mito, and Kaoru Shibata, Tokyo, all of Japan, assignors to Honshu Seishi Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 13, 1977, Ser. No. 787,143

Claims priority, application Japan, Jul. 22, 1976, 51-86566

Int. Cl.² B32B *7/02, 27/08, 27/16, 27/32*

U.S. Cl. 428—339 **27 Claims**



1. An antistatic, low-temperature heat-sealable polypropylene composite film which comprises:

(a) a substrate layer of a uniaxially stretched film of a polymer composition comprising a propylene homopolymer or a propylene copolymer containing a small amount of an alpha-olefin, said polymer composition having incorporated therein (i) a lubricant, (ii) an anti-blocking agent, and (iii) an antistatic agent; and

(b) a lamination layer or layers of a polymer blend composition comprising a low-crystalline resin of an ethylene-butene copolymer and a polyolefin resin laminated on at least one surface of said substrate layer, said polymer blend composition having incorporated therein (i) a lubricant and (ii) an anti-blocking agent,

said composite film having been stretched, after lamination, in a direction perpendicular to the direction in which said substrate layer has been stretched.

14. A process for the production of an antistatic, low-temperature heat-sealable polypropylene composite film which comprises the steps of:

melt extrusion laminating a polymer blend composition comprising (a) a polymer blend of (i) a low-crystalline resin of an ethylene-butene copolymer and (ii) a polyolefin resin; and (b) additives: (i) a lubricant and (ii) an anti-blocking agent; onto at least one surface of a uniaxially

stretched polypropylene film prepared by uniaxially stretching a polymer composition comprising (a) a propylene homopolymer or a propylene copolymer containing a small amount of an alpha-olefin and (b) additives: (i) a lubricant, (ii) an anti-blocking agent and (iii) an antistatic agent; and then

stretching the resulting laminate film in the direction perpendicular to the direction in which said polypropylene film has been stretched.

4,117,194

BICOMPONENT FILAMENTS WITH A SPECIAL CROSS-SECTION

Gerard Barbe, Craponne, and Robert Habault, Lyons, both of France, assignors to Rhone-Poulenc-Textile, Paris, France

Continuation-in-part of Ser. No. 559,421, Mar. 18, 1975, Pat. No. 3,973,073, which is a continuation of Ser. No. 356,576, May 2, 1973, abandoned. This application Jul. 21, 1976, Ser. No. 707,242

Claims priority, application France, Feb. 27, 1976, 76 05791; May 4, 1972, 72.16921

Int. Cl.[2] D02G *3/00*

U.S. Cl. 428—374 **5 Claims**

1. Side-by-side bicomponent polyester filaments having improved crimp properties, said filament of two polymers, wherein one polymer (B) is polyethylene terephthalate and the other polymer (A) is sparingly cross-linked polybutylene terephthalate having at least about 0.20 mole percent of trifunctional or tetrafunctional ester-forming crosslinking agent, based on the terephthalic acid content of the polybutylene terephthalate, said other polymer (A) having a melted state viscosity VF of at least about 2000 poises at 260° C., wherein in cross-section said one polymer (B) envelopes said other polymer (A) to an extent such as to cover, at least about 45% of the periphery of said other polymer (A).

4,117,195

MANUFACTURE OF EXTRUDED PRODUCTS

Peter Swarbrick, Upton-by-Chester; William John Green, Pinner, both of England, and Charles Maillefer, Lausanne, Switzerland, assignors to BICC Limited, London, England and Etablissements Maillefer SA, Lausanne, Switzerland

Filed Dec. 8, 1975, Ser. No. 638,448

Claims priority, application United Kingdom, Dec. 6, 1974, 52917/74

Int. Cl.[2] C08F *29/12*

U.S. Cl. 428—379 **17 Claims**

1. A method of making a cross-linked extruded product comprising:

metering into a screw extrusion machine having a barrel and a screw extending from end to end thereof a polymer capable of being cross-linked by the use of a hydrolysable unsaturated silane together with proportionate amounts of compounding ingredients comprising a hydrolysable unsaturated silane, a free-radical generator and a silanol condensation catalyst, at least one of said compounding ingredients being metered separately from said polymer;

blending said compounding ingredients with said polymer in a first zone of said barrel of said extruder to form a mixture and when blending is complete heating said mixture in a second zone of said barrel downstream of said first zone until silane groups have been grafted to said polymer, the amount of said free-radical generator being sufficiently low to limit direct free-radical cross-linking to a level that will not prevent extrusion of the material;

extruding said mixture directly out of said extruder through an extrusion die to form an elongate product of a required final shape;

and subjecting said elongate product to the action of moisture until said polymer therein is cross-linked.

14. An electric cable with cross-linked insulation made by the method claimed in claim 1.

4,117,196

PHOTOCURABLE IMIDIZABLE POLYENE-POLYTHIOL COMPOSITIONS

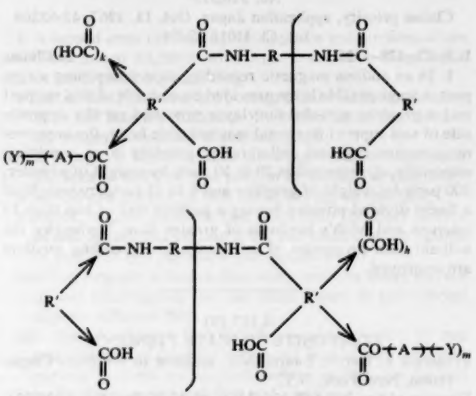
Eckart Mathias, Catonsville, Md., assignor to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 753,750, Dec. 23, 1976, Pat. No. 4,080,484. This application Sep. 2, 1977, Ser. No. 830,225

Int. Cl.[2] B05D *3/06*

U.S. Cl. 428—379 **35 Claims**

1. An amide-acid polyene of the formula:



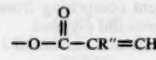
wherein

→ denotes isomerism, R is a divalent organic moiety remaining after a primary diamine has reacted to form amide linkages;

R′ is an aromatic residue attached to at least 3 carbonyl groups at least two of which groups are attached to adjacent carbon atoms on the aromatic residue;

A is an alkylene group having from 1 to 10 carbon atoms;

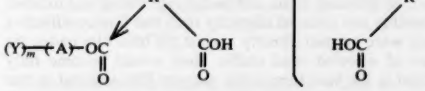
Y is



R″ is hydrogen or methyl; *k* and *h* are 0 or 1; *m* and *d* are 1 to 10 and *p* is 0 to 10.

7. A photocurable composition comprising

(A) an amide-acid containing polyene of the formula:



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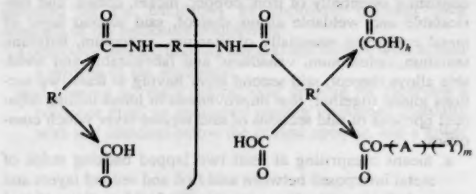


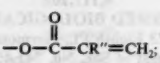
wherein

→ denotes isomerism, R is a divalent organic moiety remaining after a primary diamine has reacted to form amide linkages;

R′ is an aromatic residue attached to at least 3 carbonyl groups at least two of which groups are attached to adjacent carbon atoms on the aromatic residue;

A is an alkylene group having from 1 to 10 carbon atoms;

Y is



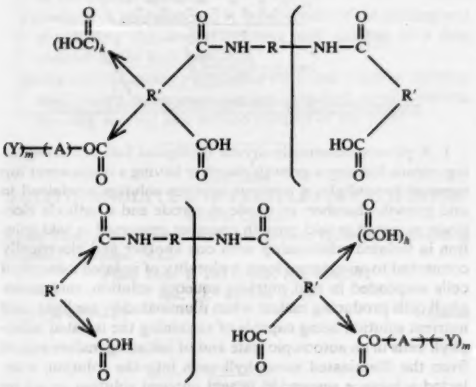
R″ is hydrogen or methyl; *k* and *h* are 0 or 1; *m* and *d* are 1 to 10 and *p* is 0 to 10,

(B) a polythiol having a molecular weight in the range from about 94 to 20,000 of the general formula: R_s—$(SH)_n$ where *n* is at least 2 and R_s is a polyvalent organic moiety, the sum of *m* and *n* being greater than 3, the polyene/polythiol mole ratio being in the range 0.2 to 8.0:1, respectively, and

(C) a photocuring rate accelerator.

19. The process of coating a substrate which comprises (1) applying to a substrate a curable composition comprising

(A) an amide-acid containing polyene of the formula:



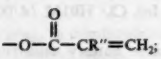
wherein

→ denotes isomerism, R is a divalent organic moiety remaining after a primary diamine has reacted to form amide linkages;

R′ is an aromatic residue attached to at least 3 carbonyl groups at least two of which groups are attached to adjacent carbon atoms on the aromatic residue;

A is an alkylene group having from 1 to 10 carbon atoms;

Y is



R″ is hydrogen or methyl; *k* and *h* are 0 or 1; *m* and *d* are 1 to 10 and *p* is 0 to 10, and

(B) a polythiol having a molecular weight in the range from about 94 to 20,000 of the general formula: R_s—$(SH)_n$ where *n* is at least 2 and R_s is a polyvalent organic moiety, the sum of *m* and *n* being greater than 3, the polyene/polythiol mole ratio being in the range 0.2 to 8.0:1, respectively, then in either order (2) exposing said curable composition under ambient conditions to a free radical generator to form a solidified, cured polythioether coating on said substrate and (3) heating said cured composition in the range 50°–250° C. to imidize the polyene.

4,117,197

PRODUCTION OF COATED BUILDING COMPONENTS

Milan Krejci, and Peter Kresse, both of Krefeld-Bockum, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 7, 1976, Ser. No. 721,128

Claims priority, application Fed. Rep. of Germany, Sep. 6, 1975, 2539718

Int. Cl.² B32B *19/04*

U.S. Cl. 428—443 **31 Claims**

1. In the production of a coated building component such as a concrete roof tile, precast concrete member, asbestos cement member or lime-sand brick, comprising the steps of mixing an inorganic binder, water and aggregate to produce a workable mass, molding said mass into a preformed component, applying to the preformed component an aqueous paste containing a metal oxide and at least one of waterglass and a phosphate to form a coating and allowing the coating to harden, the improvement which comprises applying about 190 to 400 g of the paste per square meter of surface to be coated prior to hardening of such surface, the application being effected in the presence of at least about 0.5% by weight of the inorganic binder or, in the case of lime-sand bricks, by weight of the binder plus aggregate, of a water soluble inorganic salt which converts the aqueous paste into a gel-like non-flowing form, the inorganic salt being included in the foundation or protective layer.

4,117,198

RELEASE SHEET OF A CELLULOSIC PAPER COATED WITH A RESIN MIXTURE

George Edward Power, and Donald Louis Bolling, both of Cincinnati, Ohio, assignors to Formica Corporation, Cincinnati, Ohio

Filed Nov. 3, 1976, Ser. No. 738,213

Int. Cl.² B32B *9/06*

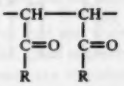
U.S. Cl. 428—452 **13 Claims**

1. A release sheet for use in the production of laminates comprising

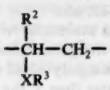
1. a cellulosic paper sheet coated with a composition comprising a mixture of

A. from about 75% to about 99%, by weight, based on the total weight of (A) and (B), of an oil-modified alkyd resin cross-linked with from about 30% to about 70%, by weight, based on the total weight of (A), of a polyalkylether of a polymethylol melamine and

B. from about 1% to about 25%, by weight, based on the total weight of (A) and (B), of a copolymer containing from about 15 to about 85 mole percent of recurring units having the formula



wherein each R is, individually, OR^1, R^1 being hydrogen or C_1–C_{22} alkyl, or the two R groups taken together form an oxa group, and the remaining units are recurring units of the formula



wherein R^2 is hydrogen or methyl, R^3 is a C_9–C_{30} alkyl radical and X is O or CH_2.

4,117,199

PROCESS FOR PRODUCING MOISTURE AND WATER-PROOF PAPER

Hideo Gotoh; Akira Igarashi, both of Tokyo; Reiko Kobayashi, and Kiyotake Akiho, both of Ichikawa, all of Japan, assignors to Oji Paper Co., Ltd., Tokyo, Japan

Filed Sep. 26, 1977, Ser. No. 836,708

Claims priority, application Japan, Sep. 27, 1976, 51-115677

Int. Cl.[2] C08H *9/08*; C08D *13/16*; C08F *45/52*; D21H *1/28*

U.S. Cl. 428—486 **15 Claims**

15. A moisture and water-proof repulpable paper comprising a paper substrate and at least one moisture and waterproof coating formed on at least one surface of said paper substrate, said moisture and water-proof coating having been prepared by coating the surface of said paper substrate with an aqueous emulsion containing a butadiene-methyl methacrylate copolymer latex and a wax emulsion in an amount of 5 to 200 parts by weight of the solid wax per 100 parts by weight of the solid copolymer and, then, drying said coated paper at an elevated temperature the same as or higher than the melting point of said wax.

4,117,200

FIRE RETARDANT WOOD PRODUCTS

Jeffrey Donald Leman, and Allan James Robertson, both of Niagara, Canada, assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 372,121, Jun. 21, 1973, Pat. No. 4,080,501. This application Sep. 16, 1977, Ser. No. 834,015

Int. Cl.[2] B32B *21/00*

U.S. Cl. 428—526 **5 Claims**

1. A fire-retardant particleboard containing at least about 2.0% of solid melamine phosphate having bonded thereto via hydrogen bonding at least about 0.5 mole of phosphoric acid per mole of melamine phosphate.

4,117,201

CORROSION AND EROSION RESISTANT LINED EQUIPMENT

Hibbard G. Keifert, Torrance, Calif., assignor to Fansteel Inc., N. Chicago, Ill.

Filed Jul. 23, 1976, Ser. No. 708,059

Int. Cl.[2] B21D *7/18*

U.S. Cl. 428—591 **12 Claims**

1. In a wall assembly of industrial equipment to resist corrosion of the type having a first structural layer of metal to provide mechanical strength and a second corrosion resistant protective layer of metal lying generally in face-to-face relation with said first layer, said frst structural layer of metal consisting essentially of iron, copper, nickel, cobalt, and fabricatable and weldable alloys thereof, said second layer of metal consisting essentially of titanium, zirconium, hafnium, tantalum, columbium, vanadium, and fabricatable and weldable alloys thereof, said second layer having at least two sections joined together, that improvement in joints uniting adjacent portions of said sections of said second layer which comprises:

a. means comprising at least two lapped backing strips of metal interposed between said first and second layers and underlying said adjacent portions of said sections of said second layer prior to fusion welding together said adjacent portions of said sections, said backing strips of metal each consisting essentially of titanium, zirconium, hafnium, tantalum, columbium, vanadium, and fabricatable and weldable alloys thereof, and

b. a continuous fusion weld uniting together said adjacent portions of said sections of said second layer without uniting any of said backing strips to said first layer.

4,117,202

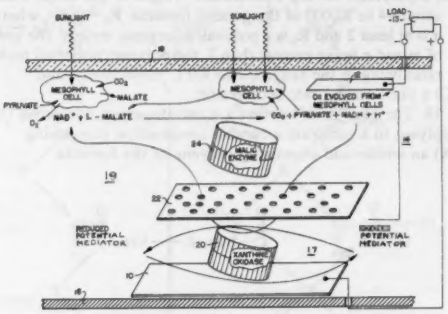
SOLAR POWERED BIOLOGICAL FUEL CELL

Timothy A. Beck, 723 Eighth Pl., Hermosa Beach, Calif. 90254

Continuation-in-part of Ser. No. 741,455, Nov. 12, 1976, abandoned. This application Jun. 14, 1977, Ser. No. 806,362

Int. Cl.[2] H01M *8/16*

U.S. Cl. 429—2 **10 Claims**



1. A photosynthetically-driven biological fuel cell comprising: means forming a growth chamber having a transparent top exposed to sunlight; a nutrient aqueous solution contained in said growth chamber; an anode electrode and a cathode electrode mounted in said growth chamber immersed in said solution in isolated relationship with one another and electrically connected to an external load; a plurality of isolated mesophyll cells suspended in said nutrient aqueous solution, said mesophyll cells producing malate when illuminated by sunlight, said nutrient solution being capable of sustaining the isolated mesophyll cells in an autotropic state and of initiating malate export from the illuminated mesophyll cells into the solution; a selected substance suspended in said nutrient solution to act on the malate to form NADH; and a potential mediator substance suspended in said nutrient solution to transfer electrons from said NADH to said anode.

4,117,203

RECHARGEABLE BATTERY ENCLOSURE

Axel O. Sjogren, Littleton, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Division of Ser. No. 738,417, Nov. 3, 1976. This application Mar. 16, 1978, Ser. No. 887,267

Int. Cl.[2] H01M *14/00*

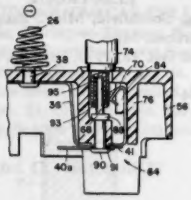
U.S. Cl. 429—7 **5 Claims**

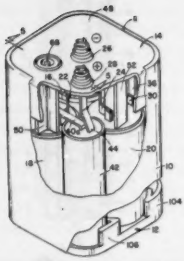
1. In a rechargeable battery construction comprising an enclosure, a plurality of electrically connected electrochemical

cells housed within the enclosure, and a pair of terminals mounted on the enclosure, an improved recharge jack mounted in the enclosure comprising:

a one-piece molded housing integral and unitary with at least a portion of the enclosure;

said housing having a central axial opening for receiving a recharge plug, an apertured landing positioned coaxially with and disposed below the central opening, and a lower





window opening surrounding the landing and connected to the central opening;

a conductive post disposed in the aperture of the landing and penetrating the central opening and serving as a first contact of the jack; and

spring contact means penetrating the lower window opening and having a forward portion disposed in the central opening serving as a second contact of the jack.

4,117,204

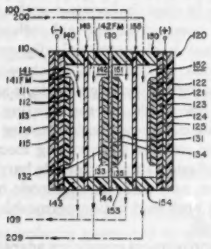
SULFITE ANOLYTE AND PERSULFATE CATHOLYTE FUEL CELL

Ralph Zito, Jr., Durham, N.C., assignor to General Engineering Labs., Durham, N.C.

Filed Dec. 1, 1977, Ser. No. 856,502

Int. Cl.[2] H01M *8/18*

U.S. Cl. 429—19 **1 Claim**



1. Fuel cell comprising, in combination,

anode and cathode forming means,

means forming plural, interleaved anolyte and catholyte compartments with anode and cathode respectively positioned therein,

ion transport means interconnecting each adjacent part of said anolyte and catholyte compartments,

means supplying and circulating liquid anolyte and catholyte solutions through said compartments essentially continuously,

said anolyte solution comprising a solute ion selected from the class consisting of sulfite and bisulfite, and

wherein said catholyte comprises a persulfate solute,

and wherein the anolyte and catholyte solutes have a common cation,

whereby a common affluent species is produced by operation of the fuel cell.

4,117,205

ELECTRIC STORAGE BATTERY

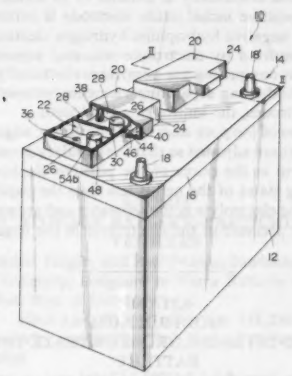
Yasuo Kitai, Kumagaya, Japan, assignor to Shin-Kobe Electric Machinery Co., Ltd., Tokyo, Japan

Filed Dec. 19, 1977, Ser. No. 862,057

Claims priority, application Japan, Dec. 29, 1976, 52-176082[U]

Int. Cl.[2] H01M *2/12*

U.S. Cl. 429—86 **7 Claims**



1. An electric storage battery comprising a closure including a battery cover sealed with a battery casing and gas venting means to vent only gases out of said closure, said gas venting means comprising a gas cooling chamber including a plural of divided chamber portions communicating with respective cells and said electric storage battery, so as to receive gases from said cells and communicating with each other through openings provided adjacent to the tops thereof, said gas cooling chamber having a water returning lateral port provided at the bottom of said divided chamber portions; a gas filter chamber provided adjacent to said gas cooling chamber to communicate with said gas cooling chamber through an opening in the wall of said gas cooling chamber at the top thereof and having an explosion-proof gas filter disposed in said gas filter chamber so as to vent said gases therethrough; and a labyrinth chamber provided to vertically move through a tortuous path gases together with electrolyte mist and water steam and having an inlet through which said gases together with said electrolyte mist and said water steam are introduced into said labyrinth chamber and an outlet through which said gases and the remaining water steam are introduced into said gas cooling chamber, said labyrinth chamber further having an electrolyte returning port provided at the bottom of said labyrinth chamber.

4,117,206

NICKEL OXIDE-HYDROGEN CELL

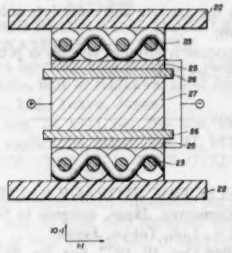
Heinz Plust, Neuhausen, and Günter Gutmann, Esslingen, both of Germany, assignors to Deutsche Automobilgesellschaft GmbH, Esslingen-Mettingen, Germany

Filed Aug. 17, 1977, Ser. No. 825,461

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1976, 2637015

Int. Cl.[2] H01M *10/34*

U.S. Cl. 429—101 **14 Claims**



1. In a rechargeable nickel-hydrogen cell with hydrogen pressure storage or hydride storage and one or more electrode units connected electrically in parallel or in series, where in each unit a positive nickel oxide electrode is surrounded on both sides by negative hydrophilic hydrogen electrodes and is separated therefrom by electrolyte-saturated separators, said electrode units comprising gas-permeable electrically conducting or non-conducting separating elements between adjacent negative electrodes, the improvement wherein

the averages of the pore sizes of the positives, negatives, and separators are adjusted so that the capillary pressure of the electrolyte in the pores of the positive electrodes in all operating states of the cell is less than the capillary pressure of the electrolyte in the separator and greater than the capillary pressure of the electrolyte in the negative electrode.

4,117,207

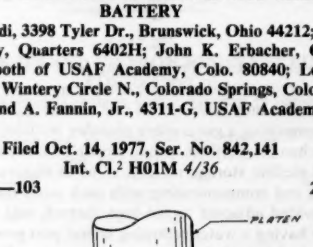
MOLYBDENUM CHLORIDE-TETRACHLOROALUMINATE THERMAL BATTERY

John C. Nardi, 3398 Tyler Dr., Brunswick, Ohio 44212; Charles L. Hussey, Quarters 6402H; John K. Erbacher, Quarters 4501-H, both of USAF Academy, Colo. 80840; Lowell A. King, 460 Wintery Circle N., Colorado Springs, Colo. 80919, and Armand A. Fannin, Jr., 4311-G, USAF Academy, Colo. 80840

Filed Oct. 14, 1977, Ser. No. 842,141

Int. Cl.[2] H01M *4/36*

U.S. Cl. 429—103 **2 Claims**



1. A thermally activated, electrochemical power source comprising:

(a) a solid anode composed of a material selected from the group consisting of lithium, aluminum, lithium-aluminum alloys and amalgamated aluminum,

(b) a solid cathode composed of a mixture of molybdenum pentachloride, a sodium tetrachloroaluminate electrolyte and graphite, and

(c) a solid sodium tetrachloroaluminate electrolyte positioned between and in contact with said anode and said cathode.

4,117,208

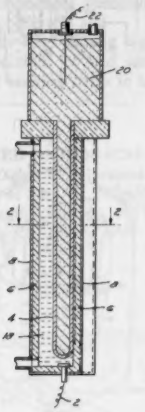
ELECTRICAL CONVERSION DEVICE WITH CERAMIC ELECTRODE

Frank A. Ludwig, Southfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 15, 1977, Ser. No. 833,547

Int. Cl.[2] H01M *6/18*

U.S. Cl. 429—104 **9 Claims**



1. In an electrical conversion device comprising:

A. A container-current collector consisting essentially of an inner, load bearing, high strength, noncorrosive and electrically conductive ceramic member, and a highly conductive metal cladding intimately attached to the outer surface of said ceramic member, said metal cladding having a thickness which preserves the function of said ceramic member as the primary load bearing element, being based on the relative elastic modulus of the metal compared to that of said ceramic member, said metal-cladding being operable to receive and shunt current flow from an inner surface of said container-current collector to an external contact;

B. A cation-permeable barrier to mass liquid transfer which is disposed within said container-current collector so as to create an anodic reaction zone within said barrier and a cathodic reaction zone between said barrier and the exterior of said container-current collector;

C. A molten alkali metal reactant-anode within said anodic reaction zone in electrical contact with an external circuit;

D. A cathodic reactant within said cathodic reaction zone which reactant is electrochemically reversibly reactive with said anodic reactant and which, when said device is in at least a partially discharged state, is an electrolyte; and

E. A cathodic electrode for transporting electrons to the vicinity of said cation-permeable barrier during discharge of said device and for transporting electrons away from the vicinity of said cation permeable barrier during charge of said device, said cathodic electrode being in electrical contact with both said cation-permeable barrier and said external circuit,

wherein the improvement comprises adapting the metal clad ceramic member described in A. to serve not only as a container-current collector for said device, but also as the cathodic electrode of said device by shaping said metal clad ceramic member such that (i) the inner surface of said

electrically conductive ceramic member is disposed in close proximity to at least a portion of the surface of said cation-permeable barrier, and (ii) there are a plurality of open channels or spaces within said cathodic reaction zone through which said cathodic reactants may flow during operation of said device.

4,117,209
ELECTROCHEMICAL CELLS

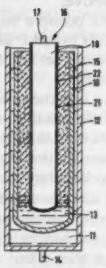
Trevor Leslie Markin, Goring-on-Thames; Roger John Bones, Abingdon; Keith Taylor Scott, Newbury; Geoffrey John May, Frodsham, and Graham Robinson, Tarvin, all of England, assignors to Chloride Silent Power Limited, London, England

Filed Nov. 21, 1977, Ser. No. 853,596

Claims priority, application United Kingdom, Nov. 22, 1976, 48656/76

Int. Cl.² H01M *10/39*

U.S. Cl. 429—104 **20 Claims**



1. In a sodium-sulphur cell having a solid electrolyte separating sodium forming an anode from a cathodic reactant comprising sulphur/polysulphides and having a cathode current collector electrically in contact with the cathodic reactant; wherein the improvement comprises a cathode current collector comprising an aluminum substrate, an interstrate layer over the surface of the substrate exposed to cathodic reactant and a coating of electronically conductive oxide material with respect to the cathodic reactant over the interstrate layer, said interstrate layer being of a nickel chromium alloy containing at least 10% by weight of nickel and at least 10% by weight of chromium, the combined nickel and chromium amounting to at least 50% by weight of the nickel-chromium alloy and the oxide coating being a plasma-sprayed or detonation-gun sprayed protective layer completely covering the interstrate layer.

4,117,210
PHOTOGALVANIC CELL HAVING TRANSPARENT PHOTOACTIVE TiO_2 THIN FILM

Satyendra K. Deb, East Brunswick; Schoen-nan Chen, North Brunswick; Horst Witzke, Princeton, all of N.J.; Michael A. Russak, Farmingdale, and Joseph Reichman, Great Neck, both of N.Y., assignors to Optel Corporation, Princeton, N.J. and Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Jan. 27, 1977, Ser. No. 763,072

Int. Cl.² H01M *6/30, 6/36*

U.S. Cl. 429—111 **13 Claims**

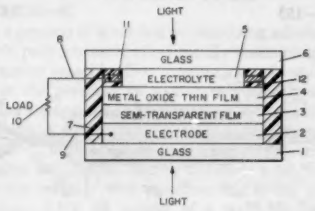
1. A photogalvanic cell that may be irradiated in more than one direction, the cell comprising:

a light transparent electrode for collecting electrical charge of a particular polarity generated by photoconversion of irradiating light;

metal oxide means positioned in spaced registry from the electrode;

means which are at least semi-transparent and positioned in abutting relation between the electrode and the metal oxide means for facilitating charge transfer between the metal oxide means and the electrode;

a light passing electrolyte contacting a free surface of the metal oxide means, a photoactive junction being formed therebetween for converting light to electrical energy; and



a counterelectrode in contact with the electrolyte and positioned so that it does not block irradiating light from passing to the electrolyte, the counterelectrode collecting electrical charge of an opposite polarity generated by photoconversion of the irradiating light.

4,117,211
ELECTRIC STORAGE BATTERY, PARTICULARLY FOR VEHICLES

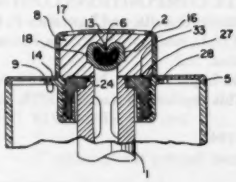
Heinz Schuster, Hagen, and Rolf Prange, Iserlohn, both of Fed. Rep. of Germany, assignors to Varta Batterie Aktiengesellschaft, Fed. Rep. of Germany

Filed Apr. 11, 1977, Ser. No. 786,230

Claims priority, application Fed. Rep. of Germany, Apr. 17, 1976, 2617016

Int. Cl.² H01M *2/30*

U.S. Cl. 429—121 **6 Claims**



1. An electric storage battery having terminal posts with inserts of a metal of lower electrical resistance and higher mechanical strength than lead, the inserts having ends protruding form the terminal posts and in the form of a tubular loop with its axis at approximately a right angle to the axis of the post, wherein

the terminal post is surrounded by a lead receptacle having a synthetic plastic encircling molding,

the synthetic plastic molding having a ring-shaped shoulder for application of a housing lid, and

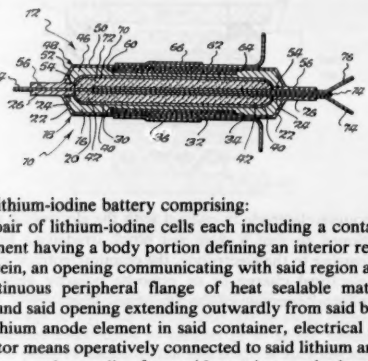
a weldment bead filling the space between the terminal post and the lead receptacle at the level of the shoulder.

4,117,212

LITHIUM-IODINE BATTERY

Ralph T. Mead, Kenmore; Frank W. Rudolph, Depew; Norbert W. Frenz, Jr., North Tonawanda, and Wilson Greatbatch, Clarence, all of N.Y., assignors to Wilson Greatbatch Ltd., Clarence, N.Y.

Filed Nov. 2, 1977, Ser. No. 847,769
Int. Cl.[2] H01M 6/18
U.S. Cl. 429—153 **15 Claims**



1. A lithium-iodine battery comprising:

(a) a pair of lithium-iodine cells each including a container element having a body portion defining an interior region therein, an opening communicating with said region and a continuous peripheral flange of heat sealable material around said opening extending outwardly from said body, a lithium anode element in said container, electrical conductor means operatively connected to said lithium anode element and extending from said container, cathode means comprising iodine-containing material in said container and operatively contacting said lithium anode, and electrical conductor means operatively connected to said cathode means and extending from said container through said opening across said peripheral flange;

(b) a separator element having generally oppositely disposed surfaces and being of a material which is heat sealable and is non-reactive with iodine;

(c) said containers being positioned on said opposite surfaces of said separator with said peripheral flanges of said containers contacting said surfaces and said cathode conductor means extending outwardly along said surfaces; and

(d) said peripheral flanges of said containers and said separator element being heat sealed together around along the periphery of the assembly.

4,117,213

ALKALI METAL SALTS OF COMPLEX ANIONS CONTAINING HETEROATOM SUBSTITUENTS AND ELECTROLYTE COMPOSITIONS CONTAINING THESE

Thomas A. Whitney, Roselle, and Lawrence P. Klemann, Somerville, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 827,132, Aug. 24, 1977, abandoned. This application Jan. 19, 1978, Ser. No. 870,662
Int. Cl.[2] H01M 6/14
U.S. Cl. 429—194 **47 Claims**

1. A compound having the formula:

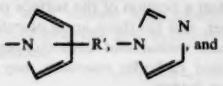
$$ZMR_xQ_y$$

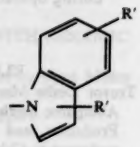
wherein Z is an alkali metal selected from the group consisting of lithium and sodium;

wherein M is a metal selected from the group consisting of Zn, Cd, B, Al, Ga, Sn (stannous), P, and As;

wherein R represents radicals which may be the same or different and are inertly substituted or unsubstituted organic radicals selected from the group consisting of alkyl radicals having 1 to 25 carbon atoms, and aralkyl radicals having 7 to 25 carbon atoms;

wherein Q represents heteroatom substituents selected from the group consisting of:





and any dimeric or trimeric composite of the foregoing radicals, and any group composed of two or three of the above structural units linked directly or through an additional carbon, wherein R′ may be the same or different and is selected from the group consisting of hydrogen and any R as defined above;

wherein x is zero or a positive integer and equals the total number of R radicals present; and

wherein y is a positive integer and equals the total valence of all Q radicals present,

subject to the provisos that the sum of x plus y is equal to one plus the valence of the metal M, and that when M is boron, y is equal to one, two or three.

21. An electrolyte composition comprising:

(a) an organic solvent selected from the group consisting of inertly substituted and unsubstituted ethers, sulfones, organic sulfates, organic sulfites, organic nitrites and organic nitro compounds; and having dissolved therein:

(b) electrolytically active alkali metal salts including an electrolytically active amount of an alkali metal salt having the formula:

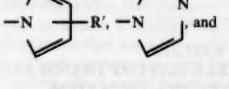
$$ZMR_xQ_y$$

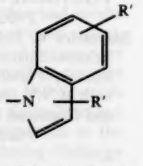
wherein Z is an alkali metal selected from the group consisting of lithium and sodium;

wherein M is a metal selected from the group consisting of Zn, Cd, B, Al, Ga, Sn (stannous), P, and As;

wherein R represents radicals which may be the same or different and are inertly substituted or unsubstituted organic radicals selected from the group consisting of alkyl radicals having 1 to 25 carbon atoms, and aralkyl radicals having 7 to 25 carbon atoms;

wherein Q represents heteroatom substituents selected from the group consisting of:





and any dimeric or trimeric composite of the foregoing radicals, and any group composed of two or three of the above structural units linked directly or through an additional carbon, wherein each R′ may be the same or different and is selected from the group consisting of hydrogen and any R as defined above;

wherein x is zero or a positive integer and equals the total number of R radicals present; and

wherein y is a positive integer and equals the total valence of all Q radicals present,

subject to the provisos that the sum of x plus y is equal to one plus the valence of the metal M, and that when M is boron, y is equal to one, two or three.

4,117,214

METHOD AND COMPOSITION FOR REDUCING THE STRENGTH OF ICE

Christ F. Parks, and Kenneth H. Nimerick, both of Tulsa, Okla., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 380,778, Jul. 19, 1973, abandoned. This application Nov. 28, 1977, Ser. No. 855,528

Int. Cl.[2] **C09K** *3/18;* **C10K** *5/00;* **F25C** *1/00, 1/12*

U.S. Cl. 427—220 **10 Claims**

5. A method for treating particulate solids having surface moisture to reduce the cohesive strength of masses of such solids when frozen, said particulate solids being neither water soluble nor water swellable, said method consisting of spraying such solids with an effective amount of a fluid composition consisting essentially of water soluble components comprising (A) a water soluble polyhydroxy compound selected from the group consisting of alkylene glycols and (B) from about 0.001 to about 2 parts sodium acetate per part of polyhydroxy compound, said composition being substantially free of corrosion inducing metal halide salts.

8. A method for treating particulate solids having surface moisture to reduce the cohesive strength of masses of such solids when frozen, said particulate solids being neither water soluble nor water swellable, said method consisting of spraying such solids with an effective amount of a fluid composition consisting essentially of water soluble components comprising (A) a water soluble polyhydroxy compound or monoalkyl ether thereof and (B) polyacrylamide having at least 10 percent hydrolysis, in an amount of from about 0.001 to about 2 parts partially hydrolyzed polyacrylamide per part of component (A), said compound (B) being different from said compound (A), and said composition being substantially free of corrosion-inducing metal halide salts.

4,117,215

INVERSION POLYMERIZATION PROCESS FOR PRODUCING VINYL RESINS

Donald Edward Witenhafer, North Olmstead, and David Thomas Popovich, Lorain, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Sep. 2, 1977, Ser. No. 830,309

Int. Cl.[2] **C08F** *2/18, 2/32, 14/06*

U.S. Cl. 526—62 **9 Claims**

1. In a process of inversion polymerizing substantially water-insoluble polymerizable ethylenically unsaturated monomer(s) in a reaction vessel by first forming a continuous monomer(s) phase in the presence of a monomer soluble surface active agent and a monomer-soluble catalyst, polymerizing said monomer phase at a temperature in the range of about 30° C. to about 80° C. with agitation until a conversion to polymer less than about 20% occurs, adding sufficient water to the monomer-polymer mixture with agitation and in the presence of at least about 0.1% by weight of a water-soluble suspending agent for said monomer(s) to form a dispersion wherein water is the continuous phase, then polymerizing the dispersion at a temperature in the range of about 30° C. to about 80° C. to convert the remaining monomer(s) to polymer, the improvement which comprises (1) applying a polyaromatic prime coating to the internal surfaces of said reaction vessel, (2) applying to said prime coating a top coating of a water-soluble suspending agent, (3) polymerizing the continuous monomer phase in constant contact with said top coating, and (4) polymerizing said continuous water phase in constant contact with said prime coating after dissolving said top coating in the continuous water phase, whereby polymer buildup on said internal surfaces is substantially eliminated.

4,117,216

INVERSION POLYMERIZATION PROCESS FOR PRODUCING VINYL RESINS

Donald Edward Witenhafer, North Olmstead, and David Thomas Popovich, Lorain, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Sep. 2, 1977, Ser. No. 830,308

Int. Cl.[2] **C08F** *2/18, 2/32, 14/06*

U.S. Cl. 526—62 **8 Claims**

1. In a process of inversion polymerizing substantially water-insoluble polymerizable ethylenically unsaturated monomer(s) in a reaction vessel by first forming a continuous monomer(s) phase in the presence of a monomer-soluble surface active agent and a monomer-soluble catalyst, polymerizing said monomer phase at a temperature in the range of about 30° C. to about 80° C. with agitation until a conversion to polymer less than about 20% occurs, adding sufficient water to the monomer-polymer mixture with agitation and in the presence of at least about 0.1% by weight of a water-soluble suspending agent for said monomer(s) to form a dispersion wherein water is the continuous phase, then polymerizing the dispersion at a temperature in the range of about 30° C. to about 80° C. to convert the remaining monomer(s) to polymer, the improvement which comprises (1) applying a coating to the internal surfaces of said reaction vessel, comprised of a water-soluble suspending agent, (2) polymerizing the continuous monomer phase in constant contact with said coating, and (3) polymerizing said continuous water phase in constant contact with said coating while dissolving said coating in the continuous water phase, whereby polymer buildup on said internal surfaces is substantially reduced.

4,117,217

METHOD OF POLYMERIZING OLEFINS

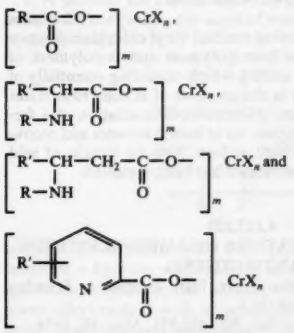
Yu-Tang Hwang, Clinton, Iowa, assignor to Chemplex Company, Rolling Meadows, Ill.

Division of Ser. No. 694,780, Jun. 10, 1976. This application May 13, 1977, Ser. No. 796,842

Int. Cl.[2] **C08F** *4/78, 10/00, 10/02*

U.S. Cl. 526—96 **11 Claims**

1. The method of making polymers of 1-olefins of 2 to 8 carbon atoms and copolymers of said olefins and 1-olefins of 2 to 20 carbon atoms which comprises polymerizing said olefins under polymerizing conditions with a catalyst prepared by dispersing on a finely divided, difficultly reducible, inorganic support of the group consisting of silica, alumina, thoria, zirconia, titania, magnesia, and mixtures thereof a chromium carboxylate containing at least four carbon atoms in each carboxylate group and essentially of the formula of the group consisting of



wherein R and R′ are each selected from alkyl, alkenyl, aryl, cycloalkyl, cycloalkenyl and arylalkyl radicals and combinations of these radicals with each R containing 3–30 carbon atoms and each R′ containing 0–20 carbon atoms and R′ can be

hydrogen and each R and R′ containing a corresponding valence-satisfying number of hydrogen atoms, *m* is a whole number of 1 to 3, *n* is a whole number of 0 to 2 and *m* plus *n* is a whole number of 2 to 3, and X is a negative group relative to chromium, and activating the resulting mixture by heating to and at an elevated temperature of from about 600°–2000° F. in a non-oxidizing atmosphere.

4,117,218
HIGH SOFTENING MALEIC ANHYDRIDE COPOLYMERS

George S. Li, Aurora, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Filed Sep. 6, 1977, Ser. No. 830,940
Int. Cl.[2] C08F *222/08*; C08K *7/14*
U.S. Cl. 526—272 **6 Claims**

1. The composition resulting from the polymerization of 100 parts by weight of

(A) from 20 to 80% by weight of styrene,

(B) from 1 to 40% by weight of maleic anhydride, and

(C) from 1 to 40% by weight of indene, wherein the combined weight percentages of (A) plus (B) plus (C) always equal 100%.

4,117,219
PROCESS FOR PRODUCING STABILIZED POLYOLEFINS

Genjiro Kakogawa, Yokohama; Tetsumi Suzuki, Isehara; Nobuaki Goko, Fujisawa, and Koji Mukuraguchi, Kawasaki, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Aug. 1, 1977, Ser. No. 820,912
Int. Cl.[2] C08F *6/10*
U.S. Cl. 528—494 **12 Claims**

1. A process for producing a stabilized polyolefin, consisting essentially of the steps of: adding an epoxide of 2 to 8 carbon atoms to a polyolefin slurry obtained through polymerization of an α-olefin in the presence of a catalyst containing a halide of a transition metal and an organoaluminum compound ahd having a catalytic efficiency of more than 5,000 to render the catalyst remaining in the polymer inactive; and then evaporating volatile materials from the polyolefin slurry after the inactivation treatment.

4,117,220
REMOVAL OF VINYL CHLORIDE FROM PVC RESINS USING MICROWAVE RADIATION

Charles H. Worman, Jr., Whitehall, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Aug. 13, 1976, Ser. No. 714,024
Int. Cl.[2] C08F *6/00*
U.S. Cl. 528—503 **2 Claims**

1. The method of removing residual vinyl chloride monomer from polyvinyl chloride homopolymers and copolymers of vinyl chloride and vinyl acetate which consisting essentially of subjecting such polymer in the presence of at least 10% water by weight of the mixture to microwave irradiation at a frequency of about 2450 mc/sec. for at least 6 minutes and recovering said polymer in which at least 90% by weight of said residual vinyl chloride monomer has been removed.

4,117,221
AMINOACYL DERIVATIVES OF AMINOGLYCOSIDE ANTIBIOTICS

Peter J. L. Daniels, Cedar Grove, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 452,571, Mar. 19, 1974, abandoned. This application Oct. 20, 1976, Ser. No. 734,166
Int. Cl.[2] C07H *15/22*
U.S. Cl. 536—17 **46 Claims**

1. A 1-N-X-aminoglycoside anti-bacterial agent selected from the group consisting of 1-N-X-gentamicin A, 1-N-X-gentamicin B, 1-N-X-gentamicin B_1, 1-N-X-gentamicin C_1, 1-N-X-gentamicin C_{1a}, 1-N-X-gentamicin C_2, 1-N-X-gentamicin C_{2a}, 1-N-X-gentamicin X, 1-N-X-sisomicin, 1-N-X-verdamicin, 1-N-X-antibiotic G-418, 1-N-X-antibiotic 66-40B, 1-N-X-antibiotic 66-40D, 1-N-X-antibiotic JI-20A, 1-N-X-antibiotic JI-20B, 1-N-X-antibiotic G-52 and the pharmaceutically acceptable acid addition salts thereof, wherein X is S-3-amino-2-hydroxypropionyl.

4,117,222
PROCESS FOR THE MANUFACTURE OF ABSORBENT, MODIFIED STARCH ETHERS AND THEIR USE

Arno Holst, Wiesbaden-Biebrich; Michael Kostrzewa, Wiesbaden, and Gerhard Buchberger, Wiesbaden-Auringen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

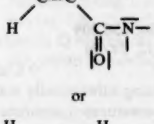
Filed Jul. 28, 1977, Ser. No. 819,944
Claims priority, application Fed. Rep. of Germany, Jul. 31, 1976, 2634539
Int. Cl.[2] C08B *31/08*
U.S. Cl. 536—50 **5 Claims**

1. In the process for the manufacture of a modified starch ethers in which, prior to, during, or after etherification, a reaction with a modifying agent is conducted in a wet alkaline medium.

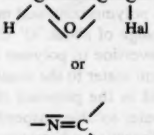
the improvement comprising that in the etherification step an etherification agent selected from the group consisting of monochloroacetic acid, sodium monochloroacetic acid, methyl chloride, ethylene oxide, propylene oxide and ethyl chloride, alone or in the form of admixtures of two or more thereof is used,

the ethers prepared from alkalized starch and said agents have a degree of substitution, without the modification step, such that they are more than 80 percent by weight water-soluble,

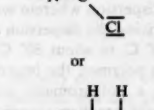
the modifying step is performed with a modifying agent selected from the group consisting of (a) 0.0005 to 0.2 part by weight per part by weight of starch of (1) a cross-linking agent carrying one of the following functional groups capable of a reaction with hydroxyl groups:


the acrylamido group wherein R_1 = H or CH_3,

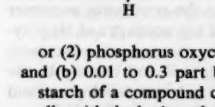
or


the α-halogen-epoxy group wherein Hal = Cl or Br,

or


the chloro-azomethine group,

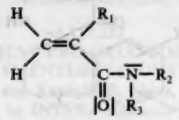
or


the allyloxy-azomethine group,

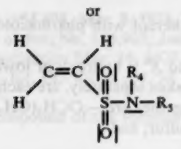
or (2) phosphorus oxychloride,

and (b) 0.01 to 0.3 part by weight per part by weight of starch of a compound capable of reacting monofunctionally with the hydroxyl groups of starch or of starch ethers

under the reaction conditions, the compound having one of the following general formulae:



or



wherein

R_1 = CH_3 or H,

R_2 = H, and

R_3 = CH_3, CH_2OH, an N-methylene-acylamido group with 1 to 3 atoms, an esterified N-methylene-carbamido group or N-carboxy methylene carbamido group with 2 to 7 carbon atoms, or

R_2 and R_3 are identical and are CH_3, or CH_2OH, and wherein

R_4 and R_5 = H, or R_4 = H and R_5 = CH_3, or

R_4 and R_5 are CH_3,

whereby the modification results in an absorbent modified starch ether more than 40 percent by weight of which is insoluble in water and the water retention capacity range of which is from about 500 to 10,000 percent.

4,117,223

PROCESS FOR THE PREPARATION OF CELLULOSE ALKYL ETHERS

Wilhelm Lödige, Elsenerstr. 9c; Fritz Lödige, Leuschnerstr. 12; Josef Lücke, Im Lohfeld 15, and Eberhard Lipp, Habichtsweb 2, all of 4790 Paderborn, Fed. Rep. of Germany

Filed Aug. 2, 1977, Ser. No. 821,134

Claims priority, application Fed. Rep. of Germany, Aug. 6, 1976, 2635403

Int. Cl.[2] C08B *11/02*

U.S. Cl. 536—99 **2 Claims**

1. Process for preparing cellulose alkyl ethers by reacting cellulose with an alkali hydroxide and subsequently reacting the alkali cellulose with a C_1–C_4-lower alkyl halide, comprising intimately mixing the cellulose mixed with the lower alkyl halide in a quantity corresponding to from 0.5 to 4 parts by weight of lower alkyl halide to 1 part by weight of cellulose in a positive mixer having a fast-running mixing appliance and a container with adjustable internal pressure and means for cooling of the internal container wall, adding the alkali hydroxide in a concentrated aqueous solution or in a substantially water-free and finely divided state to the container, adjusting the pressure of the container with cooling in such a way that the temperature of the reaction mixture remains in the range of from 15° to 40° C., and raising the temperature to from 50° to 100° C. once alkalization is ended.

4,117,224

PREPARATION OF SUCROSE 6,6'-DICHLORO HEXA-ACETATE

Riaz Ahmed Khan, Sonning; Khizar Sultan Mufti, Reading, and Kenneth John Parker, Gifford Near Wallingford, all of England, assignors to Tate & Lyle Limited, London, England

Continuation of Ser. No. 514,944, Oct. 15, 1974, abandoned. This application Dec. 11, 1975, Ser. No. 639,780

Int. Cl.[2] C07H *5/02*

U.S. Cl. 536—119 **13 Claims**

1. A process for preparing a sucrose derivative, which comprises reacting a cooled solution of sucrose in N,N-dimethylformamide with methanesulphonyl chloride, contacting the resulting product in situ with an acetylating agent whereby the hexa-acetate of 6,6'-dichloro-6,6'-dideoxysucrose is formed, and isolating said hexa-acetate from the reaction mixture.

4,117,225

PROCESS FOR THE PREPARATION OF 1-DIPHENYLMETHYL-4-(6-METHYL-2-PYRIDYLMETHYLENEAMINO)PIPERAZINE

John B. Hill, Woodstock, Ill., assignor to G.D. Searle & Co., Chicago, Ill.

Filed Jun. 30, 1977, Ser. No. 812,019

Int. Cl.[2] C07D *401/12, 295/00*

U.S. Cl. 542—425 **3 Claims**

1. A compound which is 5-diphenylmethyl-3,7-diketo-1,2-dihydro-1,2,5-triazepine.

4,117,226

SUBSTITUTED 3-CINNAMOYL-2H-PYRAN-2,6(3H)-DIONES

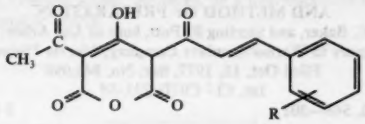
Lawrence William Chakrin, Haddonfield, N.J.; Kenneth Means Snader, Hatboro, Pa., and Chester Rhodes Willis, Kingston, Jamaica, assignors to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 659,305, Feb. 19, 1976, Pat. No. 4,015,009, which is a continuation-in-part of Ser. No. 511,153, Oct. 2, 1974, abandoned. This application Dec. 2, 1976, Ser. No. 748,243

Int. Cl.[2] C07D *309/30*

U.S. Cl. 542—438 **3 Claims**

1. A chemical compound of the formula:



wherein R is hydrogen, methoxy, methyl, hydroxy, carboxymethyleneoxy, acetamido or 3-acetamido-4-hydroxy.

4,117,227

PRODUCTION OF N-(SUBSTITUTED) MORPHOLINE

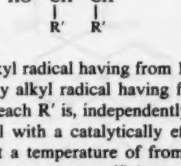
Michael E. Brennan, Austin, Tex., assignor to Texaco Development Corp., New York, N.Y.

Filed Jun. 2, 1975, Ser. No. 583,015

Int. Cl.[2] C07D *295/02*

U.S. Cl. 544—170 **2 Claims**

1. A process for producing an N-(substituted) morpholine compound comprising the steps of contacting an alkanolamine of the formula:



wherein R is an alkyl radical having from 1 to about 8 carbon atoms or a hydroxy alkyl radical having from 1 to about 10 carbon atoms and each R' is, independently, a hydrogen or a lower alkyl radical with a catalytically effective amount of ferric phosphate at a temperature of from about 190° C. to about 260° C. under a pressure sufficient to maintain the mixture substantially in liquid phase; and

recovering said N-(substituted) morpholine compound from the reaction mixture.

4,117,228

1,3-BENZODIOXOL DERIVATIVES

Satoru Tanaka, Higashikurume, and Hideaki Watanabe, Ushiku, both of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

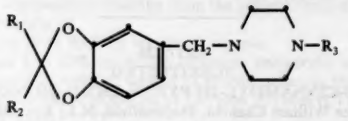
Division of Ser. No. 684,735, May 10, 1976, Pat. No. 4,051,125, which is a division of Ser. No. 609,145, Aug. 29, 1975, Pat. No. 4,026,895, which is a division of Ser. No. 503,515, Sep. 5, 1974, Pat. No. 3,981,864. This application Feb. 18, 1977, Ser. No. 770,039

Claims priority, application Japan, Sep. 8, 1973, 48-100761; Sep. 8, 1973, 48-100762

Int. Cl.[2] C07D *405/06*

U.S. Cl. 544—377 **5 Claims**

1. A member selected from the group consisting of a compound of the formula



wherein R_1 and R_2 are respectively lower alkyl of 1–2 carbon atoms and R_3 is methyl, phenyl, chlorophenyl or benzhydryl, and a pharmacologically acceptable acid addition salt thereof.

4,117,229

2-AMINO-1-(5-AMINO-1H-IMIDAZOL-4-YL)ETHANONE AND METHOD OF PREPARATION

David C. Baker, and Sterling R. Putt, both of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 11, 1977, Ser. No. 841,098

Int. Cl.[2] C07D *233/88*

U.S. Cl. 548—301 **3 Claims**

1. A compound having the name 2-amino-1-(5-amino-1H-imidazol-4-yl)ethanone and acid-addition salts thereof.

3. A process for the preparation of a compound of claim 1 which comprises reducing 2-amino-1-[5-amino-1-(arylmethyl)-1H-imidazol-4-yl]ethanone or an acid-addition salt thereof.

4,117,230

HYDANTOIN DERIVATIVES AS THERAPEUTIC AGENTS

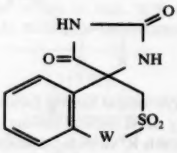
Reinhard Sarges, Mystic, Conn., assignor to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 733,062, Oct. 18, 1976, abandoned. This application Feb. 11, 1977, Ser. No. 767,803

Int. Cl.[2] C07D *491/10, 495/10*

U.S. Cl. 548—309 **11 Claims**

1. A compound of the formula:

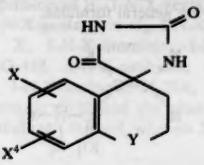


and the base salts thereof with pharmacologically acceptable cations, wherein

W is $-(CH_2)_n-$ and

n is zero or one.

4. A compound of the formula:



and the base salts thereof with pharmacologically acceptable cations, wherein

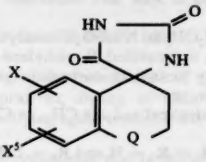
X is hydrogen and X^4 is hydroxy or lower alkoxy; or

X and X^4, when taken separately, are each lower alkoxy, and when taken together are $-OCH_2(CH_2)_nO-$

Y is oxygen or sulfur; and

n is zero or one.

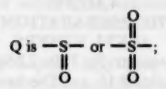
7. A compound of the formula:



and the base salts thereof with pharmacologically acceptable cations, wherein

X is hydrogen and X^5 is fluorine, chlorine, bromine or lower alkoxy; or

X and X^5, when taken separately, are each chlorine or lower alkoxy, and when taken together are $-(OCH_2(CH_2)_nO-$;



and n is zero or one.

4,117,231

NITROGENOUS CONDENSATION PRODUCTS

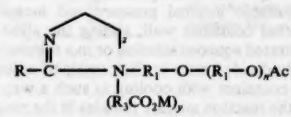
Arvid Christiansen, North Arlington, N.J., assignor to The Miranol Chemical Company, Inc., Irvington, N.J.

Division of Ser. No. 598,092, Jul. 22, 1975, Pat. No. 4,044,034. This application May 19, 1977, Ser. No. 798,278

Int. Cl.[2] C07D *233/26*

U.S. Cl. 548—352 **7 Claims**

1. A nitrogeneous compound of the formula



wherein R is an alkyl or alkenyl group of 5–25 carbon atoms;

each R_1 is an alkylene group of 2 to 4 carbon atoms and may be the same or different;

n is 0 to 4;

R_3 is alkylene of 1 to 4 carbon atoms

y is 0 to 1;

Z is $+y$;

M is selected from the group consisting of hydrogen and a cation

and Ac is a saturated residue of an α,β-unsaturated dicarboxylic acid of 4 or 5 carbon atoms wherein the carboxylic acid groups are on adjacent carbon atoms and the double bond is between two carbon atoms or immediately adjacent to one of them and wherein one of the carboxylic

acid groups may be neutralized with a base or esterified with an alcohol of 1–6 carbon atoms.

4,117,232

TRANSIENT PRO-DRUG FORMS OF PHENYLBUTAZONE

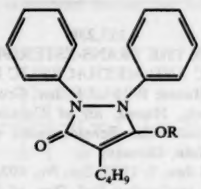
Nicolae S. Bodor, and Kenneth B. Sloan, both of Lawrence, Kans., assignors to INTERx Research Corporation, Lawrence, Kans.

Division of Ser. No. 664,698, Mar. 8, 1976, Pat. No. 4,036,845, which is a division of Ser. No. 538,903, Jan. 6, 1975, Pat. No. 3,957,803. This application Mar. 14, 1977, Ser. No. 777,074

Int. Cl.[2] C07D *231/34*

U.S. Cl. 548—365 **14 Claims**

1. A pro-drug compound of the formula:



wherein R is a member selected from the group consisting of C_1–C_2 alkylsulfonyl, phenylsulfonyl, p-tolylsulfonyl and naphthylsulfonyl.

4,117,233

2,2-DIFLUORO-13,14-DIDEHYDRO-11-DEOXY-17-PHENYL-18,19,20-TRINOR-PGF$_2\alpha$ COMPOUNDS

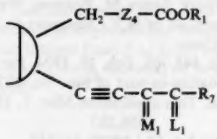
Herman W. Smith, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 657,740, Feb. 13, 1976. This application Aug. 1, 1977, Ser. No. 821,007

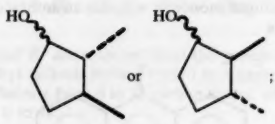
Int. Cl.[2] C07C *177/00*

U.S. Cl. 560—55 **73 Claims**

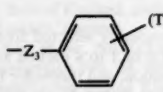
1. A prostaglandin analog of the formula



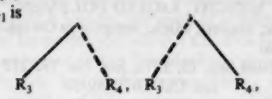
wherein D is



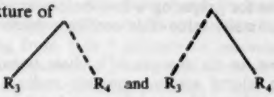
wherein Z_4 is cis-CH=CH—CH_2—$(CH_2)_g$—CF_2—, wherein *g* is one, 2, or 3;
wherein R_7 is



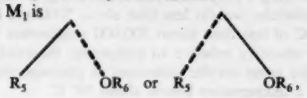
wherein Z_3 is oxa or methylene, *s* is zero, one, 2, or 3, and T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl;
wherein L_1 is



or a mixture of



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl, with the further proviso that one or both of R_3 and R_4 is fluoro only when Z_3 is methylene;
wherein M_1 is



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen; and
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,117,234

INTERMEDIATE IN THE SYNTHESIS OF ESTRONE

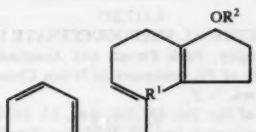
William S. Johnson, Portola, and Paul A. Bartlett, El Cerrito, both of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Continuation-in-part of Ser. No. 281,406, Aug. 17, 1972, abandoned. This application Sep. 24, 1976, Ser. No. 726,351

Int. Cl.[2] C07C *69/78*

U.S. Cl. 560—107 **3 Claims**

1. Compounds of the formula



wherein the benzene ring has at least one ortho position in relation to the olefinic chain unsubstituted and free to undergo cyclization with the olefinic group to produce a six membered ring, and wherein the benzene ring may be otherwise substituted by groups that are compatible with the Wittig reaction, and R^1 is hydrogen or lower alkyl, and wherein R^2 is hydrogen, acyl moiety of a carboxylic acid having from 1 to 7 carbon atoms, tri(lower alkyl) silyl or lower alkyl, wherein lower alkyl is of from 1 to 4 carbon atoms.

4,117,235
NOVEL PREPARATION OF NOVEL LOW MOLECULAR WEIGHT, LIQUID POLYMER

Lynn J. Taylor, Haslett, Mich., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Sep. 23, 1971, Ser. No. 183,275
Int. Cl.[2] C07C *69/54*
U.S. Cl. 560—205 **19 Claims**

1. A process for preparing a low molecular weight liquid, polymeric, thermally removable coating vehicle which comprises

polymerizing, in the absence of a chain transfer agent, at least one selectd acrylic monomer under a pressure of about 2 to about 10 atmospheres and at a temperature of about 200° C to about 300° C and close to but not exceeding the ceiling temperature of the polymeric material at the polymerization pressure, said acrylic monomer being a derivative of an acid selected from the group consisting of acrylic acid and methacrylic acid

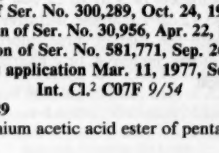
and recovering a polymeric material having a number-average molecular weight less than about 5000 and a viscosity at 25° C of less than about 200,000 centipoises which is a lower viscosity relative to polymeric material prepared from the same acrylic monomer at atmospheric pressure and at a temperature below about 50° C.

4,117,236
PHOSPHONIUM COMPOUNDS

Derek Redmore, Ballwin, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Continuation of Ser. No. 300,289, Oct. 24, 1972, abandoned, which is a division of Ser. No. 30,956, Apr. 22, 1970, abandoned, which is a division of Ser. No. 581,771, Sep. 26, 1966, Pat. No. 3,531,514. This application Mar. 11, 1977, Ser. No. 776,816
Int. Cl.[2] C07F *9/54*
U.S. Cl. 560—129 **13 Claims**

1. A phosphonium acetic acid ester of pentaerythritol of the formula



where Y is $-CH_2OH$ or $-[CH_2OOCH_2PR_3]$-$CH_2OOCCH_2PR_3$,

n is an integer of 2–4,

R is an alkyl radical of 1 to 16 carbon atoms, an alkenyl radical having 2 to 18 carbon atoms, an alkinyl radical having 2 to 18 carbon atoms, and

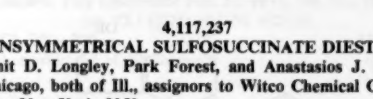
X is a halogen, sulfate, phosphate, sulfonate, phosphonate, acetate, oxalate, benzoate, maleate, oleate, perchlorate or picrate.

4,117,237
UNSYMMETRICAL SULFOSUCCINATE DIESTERS

Kermit D. Longley, Park Forest, and Anastasios J. Karalis, Chicago, both of Ill., assignors to Witco Chemical Corporation, New York, N.Y.

Continuation of Ser. No. 497,550, Aug. 14, 1974, abandoned. This application Jun. 30, 1976, Ser. No. 701,485
Int. Cl.[2] C07C *143/12, 143/14;* C07D *295/22*
U.S. Cl. 560—151 **8 Claims**

1. An unsymmetrical sulfosuccinate surfactant having the formula:



where:

R = C_1-C_{20} alkyl, or an alkylbenzene radical having at least 1, but not more than 3, nuclearly attached alkyl groups and at least 1, but not more than 2, of these alkyl groups containing 5 to 12 carbon atoms and the said such other alkyl group or groups, as may be present, containing 1 to 3 carbon atoms,

R′ = alkyl containing 1 to 18 carbon atoms or a benzene radical,

R″ = ethylene or propylene,

x = 0 to 6 and is at least 1 when R = an alkylbenzene radical,

with the proviso that the sum of the number of carbon atoms in R and R′ is from 5 to 33 and that there is a difference in the number of carbon atoms in R and R′ which difference is at least 4; and M is a cation selected from the group of alkali metals, ammonium, alkaline earth metals and water soluble organic amines.

4,117,238
PROCESS FOR THE TRANS-ESTERIFICATION OF ACRYLIC AND METHACRYLIC ESTERS

Rolf Ackermann, Hanau; Wilfried Felber, Gross-Welzheim, and Gerhard Morlock, Hanau, all of Germany, assignors to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

Filed Jun. 7, 1976, Ser. No. 693,596
Claims priority, application Fed. Rep. of Germany, Jun. 5, 1975, 2524930
Int. Cl.[2] C07C *69/54, 67/03*
U.S. Cl. 560—217 **3 Claims**

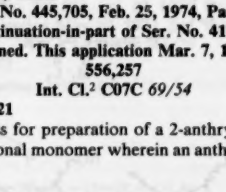
1. An improved process for the trans-esterification of esters of acrylic or methacrylic acid in the presence of a trans-esterification catalyst and a polymerization inhibitor, the improvement wherein said catalyst is at least one alkali metal cyanide, and said alkali metal cyanide is employed in an amount of about 0.05 to about 10 percent by weight, related to total weight of reactants.

4,117,239
PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND POLYMERS

Milan Stolka, Fairport; James M. Pearson, Webster, and John F. Yanus, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 445,705, Feb. 25, 1974, Pat. No. 3,923,762, which is a continuation-in-part of Ser. No. 417,317, Nov. 19, 1973, abandoned. This application Mar. 7, 1975, Ser. No. 556,257
Int. Cl.[2] C07C *69/54*
U.S. Cl. 560—221 **70 Claims**

1. In a process for preparation of a 2-anthryl or substituted 2-anthryl functional monomer wherein an anthracenic reactant of the formula



wherein

X and Y are independently selected from hydrogen, chlorine, bromine, alkyl of 1 to 4 carbon atoms or phenyl

is acylated at the 2-position, and thereafter modified by one or more additional steps at the carbonyl function to form the intended monomeric product, the improvement comprising:

(a) preparing a dispersion containing one or more of the above anthracenic reactants in an organic solvent comprising predominantly nitrobenzene; and

(b) contacting a solution containing a preformed acylating agent/Lewis Acid complex with the anthracenic reactant, the relative mole ratio of acylating agent to Lewis Acid in said solution being in the range of from about 0.5:1 to about 5:1 and the relative mole ratio of acylating agent to anthracenic reactant being in the range of from about 1:1 to about 5:1.

4,117,240
STABILIZED POLYMERIC COMPOSITIONS

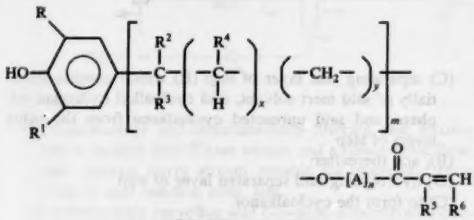
Richard H. Kline, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 56,677, Jul. 20, 1970, Pat. No. 3,962,187. This application Nov. 13, 1975, Ser. No. 631,571

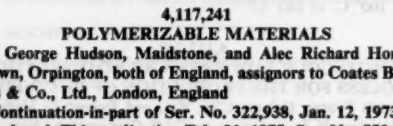
Int. Cl.[2] C07C *69/54*

U.S. Cl. 560—221 **5 Claims**

1. A phenolic compound having the following structural formula:



wherein R and R^1 are tertiary alkyl radicals having from 4 to 8 carbon atoms, wherein R^2 and R^3 are selected from the group consisting of hydrogen, alkyl radicals having from 1 to 12 carbon atoms, cycloalkyl radicals having from 5 to 12 carbon atoms, aralkyl radicals having from 7 to 13 carbon atoms and aryl radicals having from 6 to 12 carbon atoms, wherein R^4 is selected from the group consisting of alkyl radicals having from 1 to 12 carbon atoms, cycloalkyl radicals having from 5 to 12 carbon atoms and aralkyl radicals having from 7 to 13 carbon atoms, wherein R^5 is selected from the group consisting of hydrogen and alkyl radicals having from 1 to 4 carbon atoms and wherein R^6 is selected from the group consisting of hydrogen, alkyl radicals having from 1 to 4 carbon atoms, phenyl and substituted phenyl radicals, wherein *x* is an integer from 0 to 4, *y* is an integer from 0 to 11-*x*, wherein *m* is 0 or 1, *n* is an integer from 1 to 3, wherein A is selected from the group consisting of



wherein R^7 and R^8 are selected from the group consisting of hydrogen, alkyl radicals having from 1 to 4 carbon atoms and aryl radicals having from 6 to 12 carbon atoms, wherein *z* is an integer from 0 to 10.

4,117,241
POLYMERIZABLE MATERIALS

Alan George Hudson, Maidstone, and Alec Richard Hornsey Tawn, Orpington, both of England, assignors to Coates Brothers & Co., Ltd., London, England

Continuation-in-part of Ser. No. 322,938, Jan. 12, 1973, abandoned. This application Feb. 24, 1975, Ser. No. 552,329

Claims priority, application United Kingdom, May 19, 1972, 23757/72

Int. Cl.[2] C07C *69/54*

U.S. Cl. 560—224 **14 Claims**

1. A process for the preparation of a polymerizable material which comprises reacting together in one or more stages and in the presence of a polymerization inhibitor (A) a member selected from the group consisting of acrylamide and methacrylamide; (B) at least 1.5 moles, per mole of acrylamide or methacrylamide, of formaldehyde; and (C) a hydroxyl compound in an amount equivalent to the formaldehyde up to 2 moles of formaldehyde, said hydroxyl compound being selected from the group consisting of (C') monoacrylates and monomethacrylates of diprimary, disecondary and diprimary-secondary diols and mixtures of (C') and (D) at least one hydroxyl compound having from 1 to 4 primary or secondary hydroxyl groups, said component (C') being used in component (C) in an amount of from 0.1 to *k* mole, per mole of said acrylamide or methacrylamide when the average number of hydroxyl groups of component (C) is one and in an amount of from 0.95 to *k* mole, per mole of said acrylamide or methacrylamide when the average number of hydroxyl groups of component (C) is greater than 1, *k* being the number of molecules of formaldehyde used per mole of acrylamide or methacrylamide.

4,117,242
SUPPRESSION OF SIDE REACTIONS IN CATALYTIC HYDROGENATION OF DIESTERS

George B. Fozzard, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 26, 1976, Ser. No. 708,454

Int. Cl.[2] C07C *67/28*

U.S. Cl. 560—263 **6 Claims**

1. In a process for hydrogenation in which a reaction mixture comprising hydrogen and an unsaturated diester produced by reaction of hydrocarbon conjugated diolefin chosen from among straight chain and cyclic dienes having 4–8 carbon atoms and monocarboxylic acid chosen from among those defined by the formula RCOOH wherein R is an alkyl group having 1–10 carbon atoms is contacted in the presence of a noble metal catalyst the improvement of contacting said reaction mixture with said catalyst in the presence of a monoamine thereby suppressing hydrogenolysis of said diester to monoester.

4,117,243
PREPARATION OF O-BENZYLPHENOL

Charles M. Starks, and Allan J. Lundeen, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Mar. 7, 1977, Ser. No. 775,030

Int. Cl.[2] C07C *37/00*

U.S. Cl. 568—744 **5 Claims**

1. A process for preparing o-benzylphenol wherein the process comprises contacting benzyl phenyl ether in the presence of an effective amount of activated alumina in the liquid phase at a temperature in the range of about 125° to about 450° C. and a pressure of 0 to 40 atmospheres.

4,117,244

METHOD OF PRODUCING 2,6-DITERTBUTYL-4-METHYLPHENOL

Ivan Egorovich Abramov, prospekt Lenina, 87, kv. 15; Felix Borisovich Gershanov, prospekt Lenina, 81, kv. 6; Vladimir Romanovich Dolidze, ulitsa Kurchatova, 30, kv. 8, all of Bashkirskaya ASSR, Sterlitamak; Nina Vasilievna Zakharova; Alexandr Grigorievich Liakumovich, both of ulitsa Galeeva, 10, kv. 8, Kazan; Jury Ivanovich Michurov, prospekt Lenina, 13, kv. 4, Bashkirskaya ASSR, Sterlitamak; Vasily Dmitrievich Popov, Volochaevskaya ulitsa, 18a, kv. 15, Bashkirskaya ASSR, Sterlitamak; Grigory Iosifovich Rutman, ulitsa Revoljutsionnaya, 7, kv. 6, Bashkirskaya ASSR, Sterlitamak, and Zoya Stepanovna Shalimova, ulitsa Druzhby, 19, kv. 56, Bashkirskaya ASSR, Sterlitamak, all of U.S.S.R.

Filed Jun. 11, 1976, Ser. No. 695,159

Int. Cl.[2] C07C *37/10*

U.S. Cl. 568—799 **4 Claims**

1. In a method of producing 2,6-ditertbutyl-4-methylphenol which comprises hydrogenolysis of N,N-dimethyl-(3,5-ditert-butyl-4-hydroxy-benzyl)-amine in the presence of a fused catalyst containing Ni, Al, and Ti, in the medium of a solvent, the improvement comprising using 2,6-ditertbutyl-4-methylphenol as the solvent.

4,117,245

PROCESS FOR THE PRODUCTION OF NORPATCHOULENOL

Paul José Teisseire, 14 avenue Pierre Sémard, Grasse, France

Division of Ser. No. 594,335, Jul. 9, 1975, Pat. No. 4,055,594. This application Feb. 10, 1977, Ser. No. 767,461

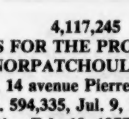
Claims priority, application Switzerland, Aug. 2, 1974, 10676/74; Apr. 9, 1975, 4602/75

Int. Cl.[2] C07C *29/00*

U.S. Cl. 568—817 **8 Claims**

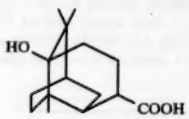
1. A process for the preparation of norpatchoulenol having the formula

I



which comprises oxidising patchoulol and then oxidatively decarboxylating the resulting acid of the formula

II



4,117,246

PROCESS FOR PREPARING A CYCLOALKANOL

Otto G. Plantema, Geleen, Netherlands, assignor to Stamicarbon, B.V., Geleen, Netherlands

Filed Dec. 9, 1977, Ser. No. 859,191

Claims priority, application Netherlands, Dec. 16, 1976, 7613947

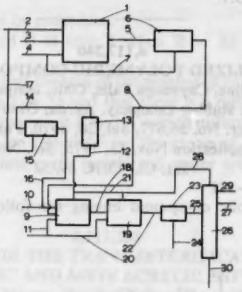
Int. Cl.[2] C07C *29/06*

U.S. Cl. 568—821 **20 Claims**

1. Process for preparing cycloalkanol from a cycloalkene, which process comprises the steps of,

(A) reacting a cycloalkene with sulphuric acid to form a reaction mixture consisting essentially of the corresponding cycloalkyl hydrogen sulphate, unreacted sulphuric acid, and unreacted cycloalkene;

(B) providing an inert solvent to said reaction mixture of step (A) to effect a zone separation into a plurality of layers wherein one layer consists essentially of sulphuric acid, and a second layer consists essentially of said inert solvent, said cycloalkyl hydrogen sulphate, and said unreacted cycloalkene;



(C) separating said layer of step (B) which consists essentially of said inert solvent, said cycloalkyl hydrogen sulphate, and said unreacted cycloalkene from the other layers of step

(B), and thereafter;

(D) hydrolyzing said separated layer of step

(C) to form the cycloalkanol.

4,117,247

PREPARATION OF 1,1,1-TRIHALOGENO-4-METHYL-3-PENTEN-2-OL

Fumio Mori, Kurashiki City; Yoshiaki Omura, Okayama; Takashi Nishida, and Kazuo Itoi, both of Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

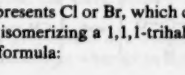
Continuation-in-part of Ser. No. 616,999, Sep. 26, 1975, abandoned. This application Apr. 11, 1977, Ser. No. 786,587

Claims priority, application Japan, Oct. 3, 1974, 49-114114; Oct. 3, 1974, 49-114115; Dec. 28, 1974, 49-2064; Dec. 28, 1974, 49-2065; Jun. 30, 1975, 50-80600

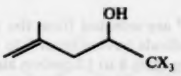
Int. Cl.[2] C07C *33/10*

U.S. Cl. 568—845 **4 Claims**

1. A process for preparing a 1,1,1-trihalogeno-4-methyl-3-penten-2ol of the formula:



wherein each X represents Cl or Br, which comprises noncatalytically thermally isomerizing a 1,1,1-trihalogeno-4-methyl-4-penten-2-ol of the formula:



wherein each X is as defined above, at a temperature ranging from 100° C. to 240° C.

4,117,248

CONTINUOUS, LOW PRESSURE ETHYNYLATION PROCESS FOR THE PRODUCTION OF BUTYNEDIOL

J. Lewis Prater, Calvert City, Ky., and Robert L. Hedworth, Kinnelon, N.J., assignors to GAF Corporation, New York, N.Y.

Filed Apr. 29, 1977, Ser. No. 792,349

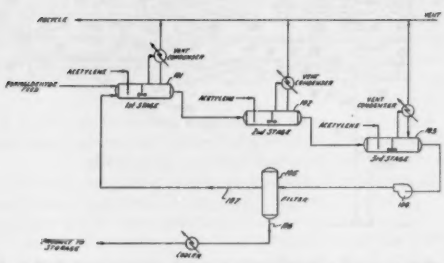
Int. Cl.[2] C07C *29/00*

U.S. Cl. 568—855 **18 Claims**

1. A continuous, low pressure ethynylation process for the production of butynediol which comprises:

(a) continuously reacting formaldehyde and acetylene in a reaction zone at a partial pressure of less than 2 atmospheres of acetylene and a reaction temperature of about 80° to about 110° C., in a stirred, aqueous medium, in the presence of a finely-divided ethynylation catalyst slurry, to form a reaction product liquid containing butynediol,

(b) continuously withdrawing a mixture of said reaction product liquid and said catalyst slurry,



(c) continuously and simultaneously filtering said mixture into a catalyst-free filtrate stream and a concentrate flowable catalyst slurry stream suitable for immediate recycling to said reaction zone, and,

(d) continuously recycling said flowable, concentrated catalyst slurry stream to said reaction zone.

4,117,249

ACETYLENIC ALCOHOLS, THEIR DERIVATIVES AND PROCESS FOR THEIR PRODUCTION

Renato De Simone, Como; Edoardo Platone, and Morello Morelli, both of San Donato Milanese (Milan), all of Italy, assignors to Anic, S.p.A., Palermo, Italy

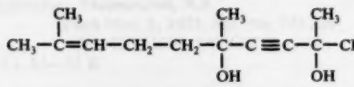
Filed Jun. 23, 1976, Ser. No. 698,812

Claims priority, application Italy, Jun. 24, 1975, 24704 A/75

Int. Cl.[2] C07C *33/04*; C11D *1/68, 1/75*

U.S. Cl. 568—855 **1 Claim**

1.



4,117,250

CONTINUOUS PROCESS FOR PRODUCING ALKYLENE GLYCOLS FROM ALKYLENE CARBONATES

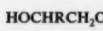
Robert Dean Foster; Thomas Arthur Maliszewski, both of Charleston; Joseph Alton Sims, Jr., Elkview, all of W. Va., and Glenn Alfred Taylor, Ridgewood, N.J., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 22, 1977, Ser. No. 863,352

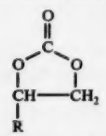
Int. Cl.[2] C07C *29/12*

U.S. Cl. 568—858 **15 Claims**

1. A continuous process for making glycols of the formula



by the base hydrolysis of an alkylene carbonate of the formula

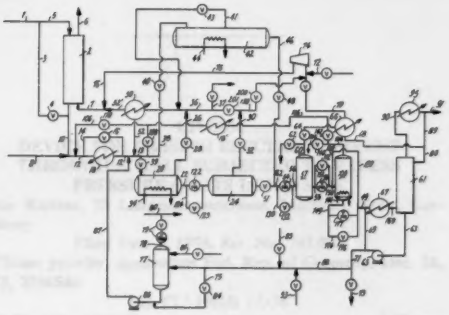


in which each R is either hydrogen or methyl, which comprises:

(A) providing the alkylene carbonate in admixture of water, carbon dioxide, alkylene glycol and potassium carbonate catalyst, to form a homogeneous liquid phase mixture;

(B) providing said mixture in a reaction zone wherein the temperature of said mixture is at least 100° C;

(C) evolving carbon dioxide from said homogeneous liquid phase mixture;



(D) separating the postassium carbonate catalyst in a mixture with alkylene glycol from glycol product;

(E) recycling said catalyst-glycol mixture to step (A); and

(F) periodically feeding potassium carbonate catalyst make-up to said catalyst-glycol mixture before it is fed to step (A).

4,117,251

METHOD FOR PREPARING STRAIGHT CHAIN PRIMARY ALCOHOLS FROM 1-BROMOALKANES

Manfred Kaufhold; Gottfried Bankwitz, both of Marl, Fed. Rep. of Germany, assignors to Chemische Werke Hüls AG, Marl, Fed. Rep. of Germany

Continuation of Ser. No. 569,939, Apr. 21, 1975, abandoned. This application Mar. 17, 1977, Ser. No. 778,549

Claims priority, application Fed. Rep. of Germany, May 15, 1974, 2423604

The portion of the term of this patent subsequent to Jul. 6, 1993, has been disclaimed.

Int. Cl.[2] C07C *29/00*

U.S. Cl. 568—877 **8 Claims**

1. In a process for preparing straight-chain, primary alcohols having 6–20 carbon atoms, the improvement comprising reacting at a temperature of about 150° to 300° C. straight-chain 1-bromoalkanes having 6 to 20 carbon atoms with alkali salts of alkanoic acids having 4 to 22 carbon atoms in the presence of 1 to 10 mole percent of alkanoic acids having 4 to 22 carbon atoms based on said alkali salts of the alkanoic acids to form esters, saponifying said esters in an alkaline medium to form straight-chain, primary alcohols having 6–20 carbon atoms and separating said straight-chain, primary alcohols.

4,117,252

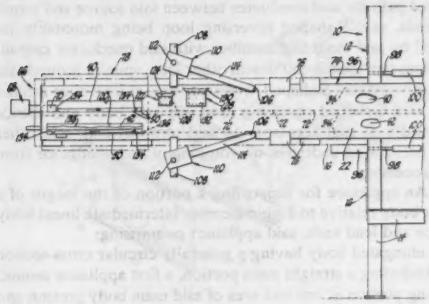
HIGH TEMPERATURE FURNACE

Harold A. McMaster, 420 Water St., Woodville, Ohio 43469

Filed Dec. 1, 1976, Ser. No. 746,455

Int. Cl.[2] H05B *3/06*

U.S. Cl. 13—25 **36 Claims**



1. A high temperature furnace comprising: a housing defining an insulated heating chamber; a plurality of electrically conductive elements received within the heating chamber; a plurality of electrical insulators positioned between the conductive elements at selected locations; the conductive elements being engaged with each other to establish an electrical flow path therethrough for heating the chamber and said insulators cooperating with the conductive elements to control the direction of the electrical flow path; resilient means located externally of the housing; and connecting means extending between the conductive elements within the heating chamber and the resilient means so as to cooperate therewith in compressing the conductive elements and the insulators therebetween whereby the conductive elements and insulators are positioned relative to each other while being allowed to expand during heating of the chamber.

4,117,253

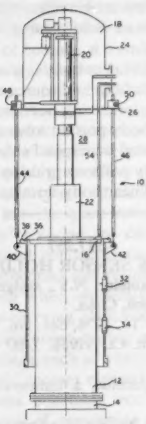
HIGH INTEGRITY ATMOSPHERE CONTROL OF ELECTROSLAG MELTING

Patrick J. Wooding, Moorestown, N.J., assignor to Wooding Corporation, Moorestown, N.J.

Filed Mar. 1, 1977, Ser. No. 773,334

Int. Cl.[2] H05B *3/60;* F27D *1/18*

U.S. Cl. 13—31 R **7 Claims**



1. In an electroslag melting furnace comprising a crucible and a furnace head spaced from the top of said crucible, said furnace head being adapted to suspend a consumable electrode within said crucible, the improvement comprising: means for making the space between said crucible and said furnace head air tight, said means including a sleeve member and means for moving said sleeve member between an inoperative position and an operative position wherein said sleeve member substantially surrounds said space and means allowing for the control of the atmosphere within said space.

4,117,254

DEVICE FOR PASSING ELECTRIC CURRENT THROUGH A WALL SUBJECTED TO EXCESS PRESSURE ON ITS INNER SIDE

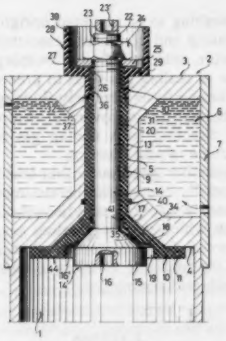
Artur Richter, 25 Langensiepenstrasse, Mulheim, Ruhr, Germany

Filed Dec. 3, 1976, Ser. No. 747,088

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1975, 2556546

Int. Cl.[2] H01B *17/26*

U.S. Cl. 174—15 BH **7 Claims**



1. A device for passing an electric current through a wall subjected to excess pressure on its inner side, and comprising: a sleeve received in an aperture in the wall, which sleeve is integrally formed at its inner end with a collar adapted to engage the inner surface of the wall; an electrical conductor for passing said electric current, which conductor includes a shaft passing through the sleeve, a head on the inner end of said shaft, and an inclined surface on said head tapering towards said shaft; a recess at the inner end of said sleeve; an opposing surface in said recess facing said inclined surface on the head of the conductor, said opposing surface comprising two conical surface portions of differing inclinations meeting at an inwardly directed common edge, which edge is in contact with said inclined surface on said head; an outer insulator including a hollow cylindrical portion for engagement between the outer end of the sleeve and the aperture in the wall, the outer end of the sleeve having an externally reduced diameter portion engaged by said hollow cylindrical portion of the outer insulator; a seal disposed between said hollow cylindrical portion and the sleeve; axially operating clamping means carried by the outer end of the shaft, which clamping means acts on the outer end of the sleeve, and on said outer insulator, to compress the sleeve between said clamping means and said head on the inner end of the shaft to expand said sleeve laterally into abutment with the wall of said aperture, and to compress said seal between said hollow cylindrical portion and said sleeve.

4,117,255

INSULATOR BUSHING FOR HIGH VOLTAGE INPUT

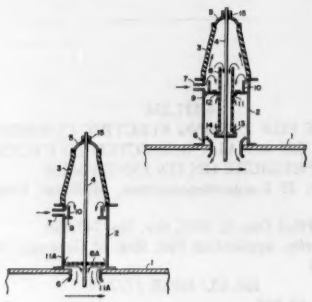
Kazuo Kawaike; Tsuneo Uchiya, and Ichiro Sato, all of Chiyoda, Japan, assignors to Hitachi Plant Engineering & Construction, Tokyo, Japan

Filed Feb. 14, 1977, Ser. No. 768,548

Claims priority, application Japan, Apr. 30, 1976, 51-54779[U]

Int. Cl.[2] H01B *17/26, 17/52;* **B03C** *3/34*

U.S. Cl. 174—31 R **3 Claims**



1. Insulator bushing to be mounted upright on and through the wall of a casing and containing essentially therein a high voltage conductor, into which said bushing is conducted a continuous flow of sealing gas so as to prevent dust-laden gas passing in said casing from adversely flowing into said insulator bushing, wherein the improvement comprises:

a means for directing such sealing gas upwardly into an interior surface of said bushing;

an insulator member disposed within said insulator bushing and substantially concentric thereto, and

at least one narrow gap formed adjacent said insulator member through which gap said sealing gas is jetted along a first surface of the insulator member so that said first surface of the insulator member is substantially entirely covered with said sealing gas.

4,117,256

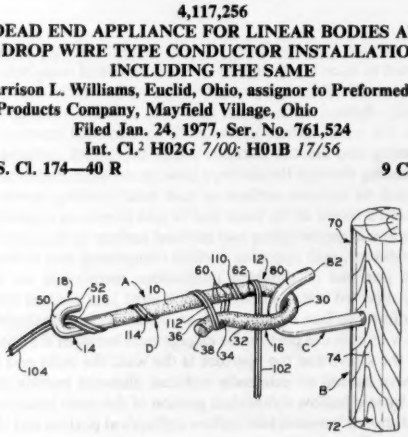
DEAD END APPLIANCE FOR LINEAR BODIES AND DROP WIRE TYPE CONDUCTOR INSTALLATION INCLUDING THE SAME

Harrison L. Williams, Euclid, Ohio, assignor to Preformed Line Products Company, Mayfield Village, Ohio

Filed Jan. 24, 1977, Ser. No. 761,524

Int. Cl.[2] H02G *7/00;* **H01B** *17/56*

U.S. Cl. 174—40 R **9 Claims**



1. In a drop wire type of conductor installation, the combination of: an elongated conductor extending from a source end to a terminal end disposed at a lower elevation than said source end and a drop wire dead end accessory supporting said conductor relative to a rigid member disposed intermediate said conductor source and terminal ends, said dead end accessory comprising an elongated generally straight body having reversing loops at the opposite ends thereof, one of said loops having a generally S-shaped configuration and received on a mounting member affixed to said rigid member for maintaining said accessory in a desired position thereon intermediate the desired path for said conductor between said source and terminal ends, said S-shaped reversing loop being mountably received by said mounting member with said conductor extending from said source end to said other loop, spirally around said body toward said S-shaped reversing loop, at least once around both said S-shaped reversing loop and said body and thence outwardly of said accessory to said terminal end, said other loop preventing undesired unwrapping of said conductor from said accessory.

8. An appliance for supporting a portion of the length of a linear body relative to a rigid member intermediate linear body source and lead ends, said appliance comprising:

an elongated body having a generally circular cross-section including a straight main portion, a first appliance mounting portion at one end area of said main body portion and a second linear body receiving portion at the other end area of said main body portion, said main body, first appliance mounting and second linear body receiving portions being integrally formed with each other; said first portion having a generally S-shaped configuration including a first curvilinear reversely bent area at said body portion one end area formed so that a section thereof extends back over a section of said main body portion toward said other end area in a converging relationship with said main body portion and with said first portion including a section adjacent said first reversely bent area extending outwardly of said main body portion, said first and main body portions defining a first portion plane; said second portion including a second curvilinear reversely bent area at said body portion other end area so that a section thereof extends back over a section of said main body portion toward said one end area, said second and main body portions defining a second portion plane disposed generally normal to said first portion plane; and, said main body and first portions having distinctly roughened surface areas for at least substantially reducing relative movement between said linear body and appliance when said portion of the length of said linear body is operably disposed on said appliance, said appliance adapted to be received at said first appliance mounting portion by a mounting means fixedly secured to said rigid member for maintaining said appliance in position intermediate a desired path for said linear body between said source and terminal ends, whereby said appliance is adapted to receive said portion of the length of said linear body in a manner such that said linear body extends from said source end to said appliance second linear body receiving portion, is spirally wrapped around said main body portion toward said first appliance mounting portion and is wrapped at least once around said main and first body portions prior to extending from said appliance to said linear body terminal end.

4,117,257

TEMPERATURE SENSOR HOLDING DEVICE

Harry L. Thomas, Alexander, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed May 17, 1976, Ser. No. 686,746

Int. Cl.[2] H05K *5/00*

U.S. Cl. 174—52 R **7 Claims**

1. In electronic apparatus, a temperature sensor holding device comprising:

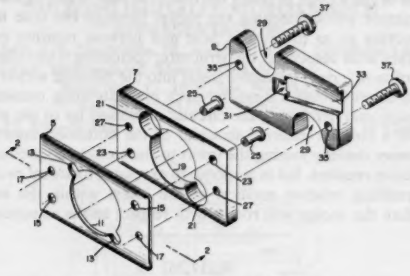
plate member means having an aperture therein for receiving a heat generating semi-conductor and formed for attachment to a heat sink;

spacer member means having an aperture aligned with said

aperture of said plate member means and formed to telescope over said heat generating semi-conductor;

a first holding means connecting said plate and spacer member means;

cover member means formed for attachment to said plate



and spacer member means, said cover member means having a cut out portion on the inner surface thereof aligned with said aperture of said spacer member means and formed to receive a temperature sensor device; and

a second holding means connecting said cover member means to said spacer and plate member means.

4,117,258

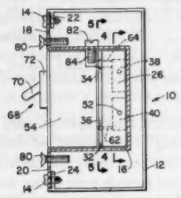
MODULAR ELECTRIC LIGHT SWITCH ASSEMBLY

Benjamin Shanker, 116 Beth Dr., Philadelphia, Pa. 19115

Filed May 21, 1976, Ser. No. 688,582

Int. Cl.[2] H01H *9/08*

U.S. Cl. 174—53 **2 Claims**



1. A modular switch assembly comprising: a switch component receptacle holder adapted to be mounted in a wall receptacle;

a female component permanently attached in said receptacle holder including, a pair of spaced apart electrical contact elements, each of said contact elements having a metallic housing, first conductor means in said housing adapted to receive in contact therewith current-carrying electrical wires and comprising a resilient metal plate bent back on itself to form a pair of spaced surfaces, said plate having an entry passage into the space between the spaced surfaces for frictionally receiving the current-carrying electrical wires, and second conductor means in said housing for electrically connecting said resilient metallic plate to said metallic housing when resiliently spaced or spread apart by the current-carrying electrical wires, and a cover on said female component having a pair of spaced prong-receiving openings, each of which is in alignment with one of said electrical contact elements; and

a male component insertable into said receptacle holder including a pair of protruding electrically conductive prongs extending through said prong-receiving openings in said cover into electrical series contact with said electrical contact elements in said female component.

4,117,259

CABLE SLEEVE

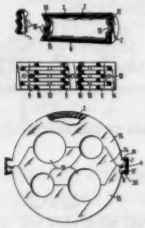
Wolfgang Giebel; Herbert Krause, both of Munich, and Hans-Juergen Meltsch, Neu-Germering, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 5, 1976, Ser. No. 674,053

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1975, 2515939

Int. Cl.[2] H02G *15/10, 15/18*

U.S. Cl. 174—92 **3 Claims**



1. A split cable sleeve comprising two mating continuous walled sleeve portions defining an inner cavity and having sealing means disposed at at least one end thereof, said sealing means including a plurality of axially displaced radially inwardly extending ribs formed integrally with the mating sleeve portions, said ribs in each of said sleeve portions defining aligned congruent semicircular cable entrance openings of equal radii, wherein the walls of said sleeve portions intermediate said ribs are completely continuous and wherein each of the ribs is adapted to engage at least a portion of a cable to be positioned through the cable entrance openings and the said inner cavity; wherein said cable entrance openings defined by said ribs are offset relative to the splitting plane and wherein said sealing means further comprises a sealing element segment including a plurality of axially displaced ribs adapted to mate with the axially displaced ribs of the respective cable sleeve portions, the ribs on said sealing element segment cooperating with the ribs on the respective cable sleeve portions to define cable entrance openings aligned with openings on adjacent ribs having a diameter equal to the diameter of the cables to be positioned through the said aligned openings.

4,117,260

COAXIAL DROP WIRE

Frederic Nash Wilkenloh, Conover, N.C., assignor to Comul Scope Company, Catawba, N.J.

Filed Aug. 17, 1977, Ser. No. 825,474

Int. Cl.[2] H01B *7/18, 9/02*

U.S. Cl. 174—106 R **13 Claims**

1. A coaxial cable comprising:

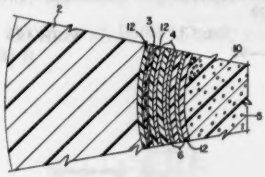
(a) an inner metallic conductor;

(b) a cylindrical core of polyolefin insulation surrounding said conductor;

(c) a laminate tape composed of two metal foils adhesively bonded to opposite surfaces of a plastic film, said laminate tape circumferentially surrounding said cylindrical core, one surface of one of said metal foils being adhesively

bonded to substantially the entire outermost surface of said cylindrical core;

(d) a metallic braid tape circumferentially surrounding said laminate tape, said braid tape lying in contact with the other of said metal foils but being unbonded thereto



whereby the tubular portion of an electrical connector is insertable between said braid tape and said laminate tape; and,

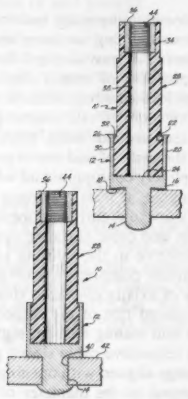
(e) a plastic jacket circumferentially surrounding said metallic braid.

4,117,261

INSULATING STAND-OFF AND METHOD OF ASSEMBLING SAME

Gerald Glen Blevins, Edmonds; William Lewis Dumar, Jr., Bellevue; Steven Royal Hansen, Alderwood Manor; Wayne Ellory Hixson, Seattle, all of Wash., and John Edward Krezak, Swarthmore, Pa., assignors to The Boeing Company, Seattle, Wash.

Filed Jul. 6, 1976, Ser. No. 702,782
Int. Cl.[2] H01B *17/16*
U.S. Cl. 174—164 **17 Claims**



1. An insulating stand-off comprising: a walled socket having a circular interior; an inwardly deformed embossed circular lip around the socket; the base to the socket having an inwardly extending frustoconical-shaped undercut in the bottom side of the base; means for fastening the socket, with the bottom side of the base of the socket adjacent to a structure, through a hole in the structure in a manner to fill the hole and prevent rotation of the socket with respect to the structure; a rigid insulative insert having a circular exterior end portion mated to and fully bottomed in the socket, said insert having an end extending outside the socket, said end being open and internally threaded to accept a threaded fastener; and a circular shoulder around a periphery of the insert located contiguous to and locked in by the inwardly deformed circular lip of the socket in a manner preventing relative rotation unless excessive torsional pressure is applied when the insert will rotate within the socket before the base to the socket will rotate with respect to the structure.

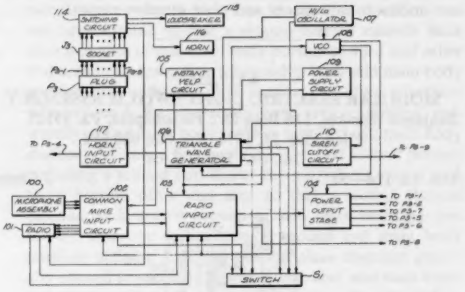
14. A method of providing an insulative stand-off comprising: drilling a hole in a structural member; preparing a metallic walled socket having a circular interior, a circular embossed lip and a frustoconical-shaped undercut on the underside of the base of the socket; pressing the undercut base firmly against the structure while fastening the socket through the hole in the structure so as to fill said hole and prevent rotation of the socket with respect to the structure; bottoming a circular end portion of a rigid insulative insert into the fastened socket with said insert having a threaded open end extending outside the socket; and deforming the circular embossed lip of the socket onto a circular external shoulder of the bottomed insert in a manner thereby joining the insert to the socket and preventing relative rotation, but in response to excessive torsional pressure permitting relative rotation of the insert within the socket before the socket will rotate with respect to the structure.

4,117,262

SOUND COMMUNICATION SYSTEM

Ronald Kaye Peecher, Huntsville, Ala., assignor to International Telephone and Telegraph Corp., New York, N.Y.

Filed Sep. 16, 1977, Ser. No. 833,972
Int. Cl.[2] H04B *1/40*
U.S. Cl. 179—1 SW **4 Claims**



1. A sound communication system, said system comprising: a first switch having a pole and at least first and second contacts for public address (PA) and siren modes of operation, respectively, said first switch pole being maintained at a predetermined potential; a voltage controlled oscillator (VCO) having a signal input, a disable input and an output; first means connected from said first switch second contact to said VCO input to modulate the VCO output frequency; a loudspeaker; second means having an input and an output, said second means input being connected from said VCO output, said second means output being connected to said loudspeaker, said second means causing said loudspeaker to broadcast audio signals of frequencies and amplitudes proportional to those existing at the output of said VCO; a two-way radio having two microphone inputs and two speaker outputs, a second switch having first, second and third ganged poles alternately engageable with corresponding radio contacts and PA contacts; a microphone having first and second leads; first and second electronic switches both connected from said first lead to said first pole and the PA contact thereof, respectively; a third electronic switch connected from said second lead to said second pole; third means connected from said first pole PA contact to said second means for operating said loudspeaker from said microphone in a PA mode; a microphone switch; a radio input circuit including a fourth electronic switch connected from said two radio speaker outputs to said second means input; a logic circuit connected from one of said third pole contacts, from said microphone switch, and from said first switch first contact, corresponding radio contacts of said first and second poles being connected to the microphone inputs of said radio, said first switch first contact being a PA contact,

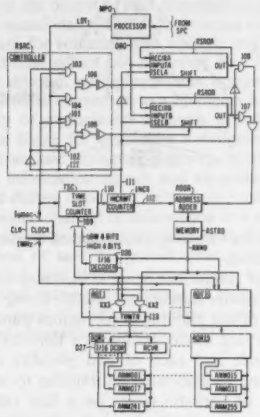
said logic circuit causing said loudspeaker to operate in the said PA mode when one of the poles of either said first or second switches engages a PA contact.

4,117,263

ANNOUNCEMENT GENERATING ARRANGEMENT UTILIZING DIGITALLY STORED SPEECH REPRESENTATIONS

Kou-Min Yeh, Naperville, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 17, 1977, Ser. No. 852,195
Int. Cl.[2] G10L *1/08;* G06F *7/22*
U.S. Cl. 179—1 SM **13 Claims**



5. An announcement generating system comprising:

a timing signal generator for generating timing signals defining time-slots of fixed duration;

memory means for storing a plurality of digital representations of speech segments wherein each speech segment representation comprises a number of data words equal to a first predetermined number stored in consecutive storage locations of said memory means and the first storage location of each speech segment representation is a unique base address;

first base address storage means for storing a number of base addresses equal to a second predetermined number of base addresses in a fixed sequence;

means responsive to said timing signals for reading said base addresses in sequence at a rate equal to one base address per time-slot;

counting means responsive to said timing signals for counting said time-slots and for generating a recurring series of time-slot count signals from **0** through said second predetermined number;

means responsive to said time-slot count signals for generating an increment signal when said time-slot numbers change from said second predetermined number to zero;

means responsive to said increment signal for generating an increment code equal to the number of increment signals generated;

means for generating incremented base addresses by adding each base address read by said reading means to said increment code;

means for accessing data words from said memory means at the addresses defined by said incremented base addresses;

a plurality of announcement generators each associated with a unique one of said time-slots; and

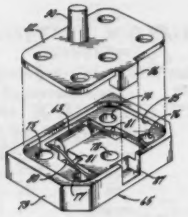
means responsive to said time-slot count signals for transmitting data words read from said memory means to the announcement generator associated therewith.

4,117,264

DIODE PACKAGE FOR USE WITH A CENTRAL OFFICE CONNECTOR MODULE

Joseph T. Charles, Barrington Hills, and James P. Ryan, Marengo, both of Ill., assignors to Coil Sales & Manufacturing Company, Rolling Meadows, Ill.

Filed Aug. 2, 1977, Ser. No. 821,244
Int. Cl.[2] H04Q *1/00*
U.S. Cl. 179—1 PC **5 Claims**



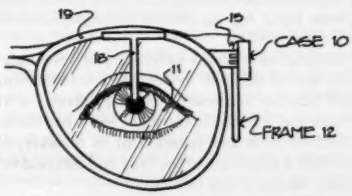
1. A diode package comprising a substantially flat wafer, first and second spaced holes formed through said wafer and extending from one face of the wafer to the other face thereof, a cavity formed within said wafer between said faces, a diode disposed within said cavity, a first conductor connected electrically to the anode terminal of said diode and extending to said first hole, and a second conductor connected electrically to the cathode terminal of said diode and extending to said second hole.

4,117,265

HYPEROPTIC TRANSLATOR SYSTEM

Richard K. Gerlach, Rolling Hills Estates, Calif., assignor to Richard J. Rengel, Rolling Hills Estates, Calif.

Filed Jun. 28, 1976, Ser. No. 700,545
Int. Cl.[2] G02B *17/00*
U.S. Cl. 179—1 SP **18 Claims**



1. A hyperoptic translator adapted to be supported alongside eyeglasses and the like, said translator comprising:

a small source of light;

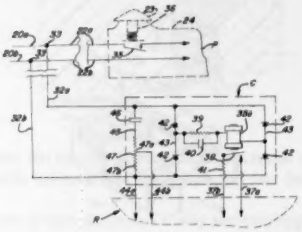
means for receiving signals and modulating light from said source; and

means for supporting the source of light, said support means including an individual member for locating the source of light alongside an eyeglass lens and in front of the pupil of the eye and at a distance less than the focal distance of the eye to project out-of-focus on the macula area of the retina of the eye, the width of said member and source mounted thereon being approximately less than the radius of the pupil of the eye in ambient light.

4,117,266
RECORDER ACTUATOR FOR COMMUNICATION LINES

Richard W. Williams, 2837 S. Raritan, Englewood, Colo. 80110

Filed Jul. 13, 1977, Ser. No. 815,313
Int. Cl.[2] H04M 1/64
U.S. Cl. 179—6 R 6 Claims



1. An adapter circuit to connect a tape recorder to the input line of a telephone to initiate recording responsive to the voltage drop in the input line, as from the higher "off" voltage to a lower "on" voltage when the telephone is lifted from its receiver and to cease recording responsive to the voltage rise in the input line, to the higher "off" voltage when the telephone is returned to its receiver, said tape recorder including a starting circuit and a recording circuit, and wherein the adapter circuit comprises:

(a) a relay means having a coil whose leads shunt the leads of the telephone input line and a normally closed switch in the recorder starting circuit which opens whenever the coil is energized by a limiting current therethrough;

(b) a resistance means in series with the coil to limit the current through the coil to a value sufficient to hold said normally closed switch open when said "off" voltage is at the input line but to a lower value insufficient to open said switch when the reduced "on" voltage is at said input line; whereby

(c) said relay switch in the tape recorder starting circuit and is adapted to turn the tape recorder on and off as it closes and opens;

(d) means to connect said recording circuit with the telephone input line to receive voltage fluctuations in the input line; and

(e) a capacitance means shunting said resistance means, at one side of the coil, to provide a transient current drop and increase responsive to, respectively, a voltage decrease and increase in the input line when the telephone is lifted off from and returned to its receiver, whereby to provide a positive current drop and increase in the coil to assure action of the switch.

6. A telephone line actuated recorder operating circuit comprising:

(a) means for connection to a two conductor telephone line;

(b) normally closed solenoid actuated relay means connected across the two conductor lines to permit line voltage to hold said relay means open;

(c) a resistor in one lead to the solenoid of said relay means to limit holding current and a parallel capacitor with said resistor providing relay operating current;

(d) a bridge circuit means in the leads of said relay means for eliminating polarity in said relay means;

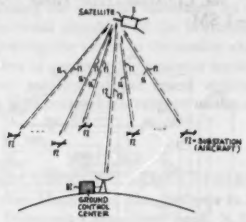
(e) a pair of leads to a recorder switch circuit connected to the relay means; and

(f) resistor means in said pair of leads limiting current drain from the recorder.

4,117,267
SYSTEM FOR TWO-WAY COMMUNICATION BETWEEN A MASTER STATION AND A PLURALITY OF SUBSTATIONS VIA A SATELLITE

Heinz Haberle, Herrsching, and Richard Aubele, Stuttgart, both of Germany, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Mar. 28, 1977, Ser. No. 781,911
Claims priority, application Fed. Rep. of Germany, Apr. 8, 1976, 2615198
Int. Cl.[2] H04J 3/06
U.S. Cl. 179—15 BS 3 Claims



1. A system for two-way communication comprising:

a master station;

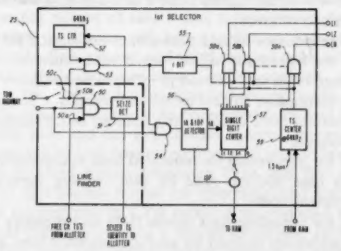
a plurality of substations being in two-way communication with said master station via a satellite acting as a transponder, each of said plurality of substations transmitting information to said master station in a time division multiple access mode and each of said plurality of substations transmitting its associated information to said satellite in the form of periodic bursts on a first radio frequency channel common to all of said plurality of substations, the instant of said bursts of each of said plurality of substations being fixed with respect to the instant of reception of a reference frame sync signal transmitted from said master station to all of said plurality of substations via said satellite; and

said master station transmits its information intended for said plurality of substations to said satellite together with said reference frame sync signal on a second radio frequency channel different than said first radio frequency channel.

4,117,268
DIGITAL DIRECT RESPONSE SWITCHING SYSTEM

William F. Bartlett, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Tampa, Fla.

Filed Apr. 9, 1976, Ser. No. 675,337
Int. Cl.[2] H04Q 11/04; H04J 1/14
U.S. Cl. 179—15 AT 49 Claims



1. A time division multiplex switch for use in a step-by-step type telephone switching system and having a single input terminal for connection to a multiplex highway carrying a plurality of multiplexed channels of information in a recurring

time frame, each channel providing information signals and supervisory signals including signals representative of dialing impulses identifying the successive digits of a called subscriber number, and a plurality of output terminals to a selected one of which a designated channel of information is to be applied in accordance with the received dialing impulses representative of a single digit during a selected time slot of said recurring time frame, said switch comprising

demultiplexing means connected to said input terminal for extracting said designated channel of information from said multiplex highway;

means for detecting the dialing impulses representative of a single digit in said designated channel received from said demultiplexing means;

multiplexing means responsive to said detecting means for connecting the output of said demultiplexing means to an output terminal identified by the detected single digit; and

control means for actuating said multiplexing means during a selected time slot of said recurring time frame.

21. A time division multiplex switch comprising demultiplexing means to be connected to a multiplex highway carrying a plurality of multiplexed channels of information in a recurring time frame for extracting a designated channel of information from said multiplex highway, each channel providing coded information signals and supervisory signals including coded dialing impulses, multiplexing means for applying said designated channel of information to a selected one of a plurality of output terminals identified by the received coded dialing impulses of said designated channel of information during a selected time slot of said recurring time frame, and means connected between the output of said demultiplexing means and the input of said multiplexing means for stretching said designated channel of information to the full width of said time frame.

4,117,269
TIME DIVISION MULTIPLEX TELECOMMUNICATION EXCHANGE

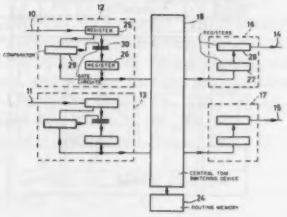
Hans van Kampen, Hilversum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 27, 1975, Ser. No. 608,391

Claims priority, application Netherlands, Sep. 11, 1974, 7412053

Int. Cl.[2] H04J *3/16*

U.S. Cl. 179—15 BW **1 Claim**



1. Time division multiplex telecommunication exchange, of the type comprising a number of line circuits to which incoming and outgoing transmission channels are connected, which transmission channels are arranged for the transmission of bit streams divided into bit groups, switching means connected to each transmission channel for the transmission in time division multiplex of bit groups from selected line circuits of the incoming transmission channels to selected line circuits of the outgoing transmission channels, a common bus line on which said bit groups are conducted through said switching means, the improvement wherein each of the line circuits for the incoming transmission channels comprises a separate comparator means for comparing each bit group received with the preceding bit group and gate means responsive to said comparator means for preventing a bit group from being supplied to the switching means when the comparator detects equality, said switching means selecting and allocating a free time division multiplex time slot only in response to the passage of a bit group through said gate means and wherein the line circuits for the outgoing transmission channels comprise means for the retransmission of a bit group when no new bit group has been received from the switching means within a predetermined time.

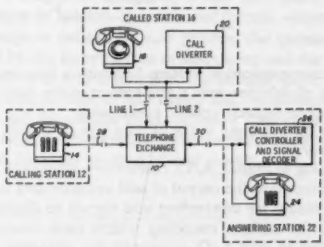
4,117,270
TELEPHONE ANSWERING AND CALL DIVERTING SYSTEM

Ronald A. Lesea, Redwood City, Calif., assignor to Candela Electronics, Inc., Sunnyvale, Calif.

Filed Feb. 28, 1977, Ser. No. 772,487

Int. Cl.[2] H04M *3/54*

U.S. Cl. 179—18 BE **12 Claims**



1. A telephone call diverting and answering system comprising:

a telephone exchange means coupled to a calling station by a first telephone line, coupled to a called station by a second telephone line and a third telephone line, and coupled to an answering station by a fourth telephone line, said exchange means being responsive to a first dialed signal on said first line and operative to generate a ring signal on said second line and to connect said first line to said second line when a response to said ring signal is detected, said exchange means being further responsive to a second dialed signal on said third line and operative to generate a ring signal on said fourth line and to connect said third line to said fourth line when a response to said second ring signal is detected;

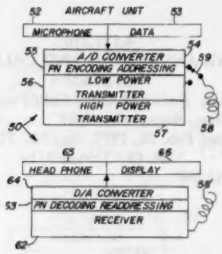
call diverting means disposed at said called station and coupled to said second and third lines, said diverting means being responsive to said first ring signal and operative to generate said second dialed signal and an identification code signal on said third line, responsive to a connect command signal on said third line and operative to connect said second line to said third line and responsive to a disconnect command signal developed on said third line and operative to disconnect said third line from said second line; and

diverter control means disposed at said answering station and coupled to said fourth telephone line, said control means being operative to detect said identification code signal and to identify said called station, said diverter control means also including means for generating said connect signal whereby a call from said calling station to said called station will be diverted to said answering station with said answering station being able to determine the identity of said called station without the calling party knowing that the call has been diverted and means for generating said disconnect signal following the termination of a communication between the calling station and the answering station.

4,117,271
INDUCTIVE COMMUNICATION SYSTEM

Wallis L. Teeter, and David J. Richter, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 10, 1977, Ser. No. 757,819
Int. Cl.[2] H04B 5/06
U.S. Cl. 179—82 **4 Claims**



1. A communication system between a base station and a plurality of vehicles with a transceiver at the base station and a transceiver in each vehicle comprising:

means for initiating voice or data signals within each transceiver;

an analog to digital, A/D, converter within each transceiver connected to the output of said voice or data signal initiating means for converting said signals to digital form;

means for address encoding within each transceiver connected to said A/D converters for encoding said digital signals as pseudo-noise;

a transmitter connected to the output of said A/D converter for transmitting said pseudo-noise encoded digital signals;

a receiver within each transceiver for receiving pseudo-noise encoded digital transmissions;

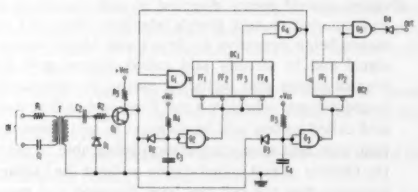
means for address decoding said pseudo-noise encoded digital transmissions into digital signals connected to the output of said receiver within each transceiver;

a digital to analog, D/A, converter connected to the output of said address decoding means within each transceiver for converting said digital signals to analog signals; means connected to the output of said D/A converter for displaying data signals received from a transceiver; and loop means for inductively coupling said transceivers so as to be capable of two-way voice communication transmissions with said plurality of vehicles and said base station.

4,117,272
START CIRCUIT FOR TELEPHONE ANSWERING DEVICE

Shizuo Ando, Kawagoe, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Apr. 29, 1977, Ser. No. 792,370
Claims priority, application Japan, Apr. 30, 1976, 51-48500
Int. Cl.[2] H04M 1/64
U.S. Cl. 179—84 R **6 Claims**



1. A start circuit for a telephone answering device or the like for distinguishing between a bell signal having a repeating burst pattern with a blank time between bursts and more than a predetermined number of cycles in each burst, and noise signal bursts, such as dial signals, having a variable number of cycles in each burst less than the predetermined number, comprising:

(a) means for generating pulses in response to input signal bursts,

(b) a first counter for registering the number of cycles in each input signal burst,

(c) means connecting said pulses generated by said generating means to said first counter,

(d) means for resetting the first counter after the termination of each input signal burst,

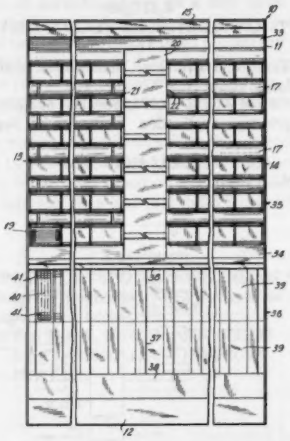
(e) a second counter for registering the number of times the first counter reaches said predetermined number, and

(f) means for producing a bell signal recognition signal in response to the second counter reaching a predetermined count.

4,117,273
SINGLE SIDED PROTECTOR FRAME FOR TELEPHONE CIRCUITS

Charles L. Gautier, Warren, N.J.; Paul V. DeLuca, Port Washington, and Albert Atun, Valley Stream, both of N.Y., assignors to Porta Systems Corp., Syosset, N.Y.

Filed Oct. 20, 1977, Ser. No. 843,716
Int. Cl.[2] H04M 3/00; H01R 9/00
U.S. Cl. 179—98 **2 Claims**



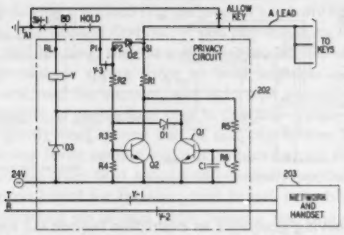
1. An improved telephone frame construction comprising: a vertically oriented frame element including a plurality of vertically and horizontally oriented frame members, said frame members defining a first plurality of upper block mounting areas and a second plurality of lower block mounting areas on a single vertical side of said frame element; a plurality of connector blocks mounted within said upper area, a plurality of protector blocks mounted within said lower area, a plurality of vertically oriented cable troughs positioned between said upper areas, and a plurality of horizontal cable troughs disposed above and below said upper block mounting areas; and at least one jumper trough communicating with each of said horizontal cable troughs; said frame element defining an open area for accommodating conductors interconnecting terminals on said connector blocks and said protector blocks.

4,117,274

KEY TELEPHONE PRIVACY CIRCUIT

Thomas Burt Cannon, Thornton; Robert Forcier Metz, Boulder, and James Louis Simon, Northglenn, all of Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 26, 1973, Ser. No. 428,067
Int. Cl.[2] H04M *1/68*
U.S. Cl. 179—99 4 Claims



4. A privacy circuit for use in a key telephone station set having ability to connect a station handset to any one of a plurality of central office lines appearing at said key telephone station set, said privacy circuit adapted to prevent the connection of said station handset with a selected busy central office line and comprising:

means for determining the busy idle status of any selected line appearing at said key telephone station set,

means operable for breaking any connection between said station handset and said selected central office line,

first means operable for enabling said breaking means when said selected central office line is determined busy, so as to open said connection, and

second means operable for preventing the enabling of said first means when said selected central office line is determined idle so as to allow said connection between said station handset and said selected central office line,

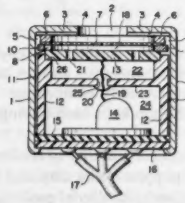
said station set comprising a key contact operable for making said station set appear to said determining means first idle and then busy when a central office line is selected.

4,117,275

NON-DIRECTIONAL ELECTRET MICROPHONE WITH AN AIR PASSAGE TO BALANCE PRESSURES ON OPPOSITE SIDES OF THE DIAPHRAGM

Kunio Miyanaga, and Kosaku Kawada, both of Miyagi, Japan, assignors to Chemi-Con Onkyo Co., Ltd., Miyagi, Japan

Filed Jun. 13, 1977, Ser. No. 806,129
Claims priority, application Japan, Jun. 11, 1976, 51-075775[U]
Int. Cl.[2] H04R *19/04*
U.S. Cl. 179—111 E 7 Claims



1. A non-directional capacitive microphone assembly comprising:

(a) a generally cylindrical casing of electrically conductive material, said casing having an upper end closed except at least one sound hole, and a groove radially extending from said sound hole to the corner thereof in the inner surface of said closed upper end thereof;

(b) an electret diaphragm disposed in said casing in a facing relation to said sound hole to receive sound pressure through said sound hole, a front surface of said diaphragm being electrically connected to said casing;

(c) an electrode plate disposed in said casing and spaced apart from a rear surface of said diaphragm;

(d) a closure means for closing a lower end of said casing air-tightly;

(e) an electronic circuit means connected to said casing and said electrode plate;

(f) a ring-like spacer of electrically insulative material, said spacer being disposed between said diaphragm and said electrode plate to provide an air space therebetween, said spacer being formed at least in an inner portion thereof with a cut-away portion; and

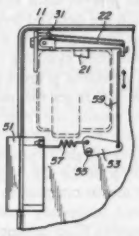
(g) an air passage for providing an air communication between a front side space and a rear side space of said diaphragm to balance air pressures therein, wherein said air passage is defined by said groove, the annular space defined by the inner surface of said casing and the peripheral surface of said diaphragm, the annular space defined by the inner surface of said casing and the surface of said spacer, and the annular space defined by the inner surface of said casing, the outer side surface of said electrode plate and said cut-away portion of said spacer.

4,117,276

HANDSET LOCKING AND RELEASE MECHANISM

Ronald Anthony Zurawski, Rolling Meadows, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 23, 1977, Ser. No. 799,852
Int. Cl.[2] H04M *1/06*
U.S. Cl. 179—161 4 Claims



1. A telephone apparatus comprising:

a handset with a heel and a head, the head having a recessed notch;

a base having a first part with a protruding curled lip shaped to receive and hold the heel of the handset and a second part adapted to receive the head of the handset when said handset is placed on said base;

a locking arm with a boss, the arm being pivotally mounted on said base and the boss being located on said arm at a distance from the pivot to mate with the recessed notch in the head of the handset;

a spring loaded mechanism for keeping said locking arm in a locked position whereby its boss is kept mated in the recessed notch in the head of the handset, said mechanism adapted to be operable to move the locking arm and thereby the boss away from the recessed notch to a released position to release the handset in response to an external pressure applied thereto.

4,117,277

ARRANGEMENT FOR SIMULTANEOUS TWO-WAY DATA TRANSMISSION OVER TWO-WIRE CIRCUITS

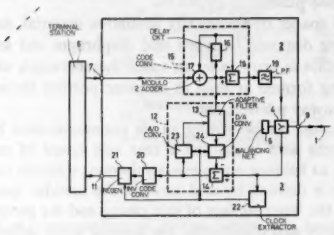
Hendricus Christianus van den Elzen; Petrus Josephus van Gerwen, and Wilfred André Maria Snijders, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 16, 1977, Ser. No. 807,008

Claims priority, application Netherlands, Jun. 28, 1976, 7607037

Int. Cl.[2] H04B *3/20*

U.S. Cl. 179—170.6 **8 Claims**



1. An arrangement for simultaneous two-way transmission of data signals with a symbol frequency 1/T over a two-wire circuit having a given bandwidth, said arrangement comprising a one-way transmit channel, a one-way receive channel, a coupler means for interconnecting said channels and the two-wire circuit, an echo canceler comprising an adaptive filter means with adjustable filter coefficients for producing from signals in the transmit channel an approximated echo signal, means for differentially combining said echo signal with signals in the receive channel for forming a residual signal, said filter coefficients being adjustable under the control of the residual signal and the signals in the transmit channel for minimizing a prescribed function of the residual signal, the transmit channel comprising a code converter means for converting *p*-level data symbols into modified *p*-level data symbols including means for adding modulo-p the *p*-level data symbols and modified *p*-level data symbols which are delayed over a time NT, where N is an integer and means for converting modified p-level data symbols into $(2p-1)$-level data symbols including means for linearly subtracting said modified p-level data symbols which are delayed over a time NT from the modified p-levei data symbols from said adding means, the receive channel comprising an inverse code converter means for converting $(2p-1)$-level data symbols into *p*-level data symbols whose levels are equal to the level modulo-*p* in the $(2p-1)$-level data symbols, and an extraction circuit means coupled to the receive channel for recovering the symbol frequency from the signals in the receive channel; said adaptive filter comprising a digital adaptive filter having input means for receiving the modified p-level data symbols from the code converter in the transmit channel and signal samples of the residual signal occurring at sampling instants determined by the recovered symbol frequency and means for adjusting the filter coefficients.

4,117,278

SERVICE OBSERVING TERMINAL

Marilyn Carol Ehrlich, and Roy Leonard Schafersman, both of Columbus, Ohio, assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 19, 1977, Ser. No. 834,252

Int. Cl.[2] H04M *3/22*

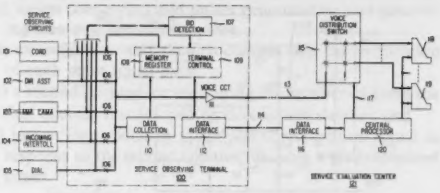
U.S. Cl. 179—175.2 C **22 Claims**

9. A service observing terminal for use in selectively collecting call information from a plurality of service observation circuits and processing the call information at an evaluation center, said terminal comprising

means for storing information,

means responsive to commands received from said evaluation center for decoding said commands and selectively recording status information identifying operational states of ones of said service observation circuits in said storing means,

means responsive to said decoding and selectively recording means for selecting on a priority basis and in accordance with the recorded status information one service observation circuit from a plurality of service observation circuits



each having generated an evaluation request bid for information processing, and

means responsive to said selecting means for transmitting a bid received signal to said evaulation center and for coupling said one selected service observation circuit to said evaluation center in response to a bid accepted signal received therefrom within a predetermined interval of time.

4,117,279

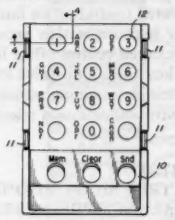
MODULAR PUSHBUTTON KEYSET ASSEMBLY

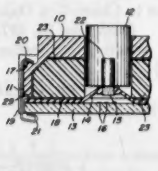
Hans Louis Schoemer, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 20, 1977, Ser. No. 799,054

Int. Cl.[2] H01H *9/04, 9/08*

U.S. Cl. 200—5 A **3 Claims**





1. A modular repairable pushbutton keyset assembly for mounting in, and interconnection with, a handset of a telephone set, said keyset assembly comprising:

a plurality of pushbutton keys each having at least one protruding rib;

a flat element including a plurality of resilient popples, raised portions of said popples being disposed to support corresponding ones of said plurality of pushbutton keys, each of saidpopples having a conductive underside;

a circuit board including a plurality of electrical contact pairs being disposed on the top surface thereof and opposite corresponding ones of said popples, each contact pair extending to the edge of the top surface of said circuit board for interconnection with the handset;

an outer housing having a protruding tongue and a protruding rib at the periphery, said outer housing engaging the protruding rib of said keys to retain and hold said plurality of keys in a predetermined spatial relationship with one another;

a light pipe assembly interposed between said outer housing and said flat element and circuit board for illuminating said keys and housing and urging said flat element against said circuit board; and

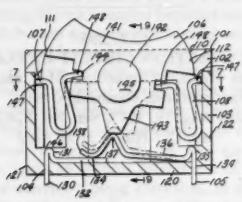
a clip having a hooked first end and an inwardly bent second end, the hooked first end of said clip engaging the tongue in said housing, the inwardly bent second end of said clip providing a spring force to hold together said circuit board, said flat element, said light pipe assembly and said plurality of pushbutton keys in operative relationship, the inwardly bent second end of said clip further exerting a friction force against said circuit board along the edge of said inwardly bent second end spatially opposed to said circuit board for retaining said keyset assembly, and the protruding rib of said outer housing applying a concentrated compressive force to said flat element and said circuit board for providing a contamination resistant seal between said flat element and the top surface of said circuit board and between said housing and said flat element when said keyset assembly is held together.

4,117,280

MINIATURE SWITCHES

Donavon L. Feaster, New Bedford, Mass., assignor to Sonitronic, Inc., Flushing, N.Y.

Filed Mar. 4, 1977, Ser. No. 774,318
Int. Cl.[2] H01H *21/36*
U.S. Cl. 200—6 B **2 Claims**



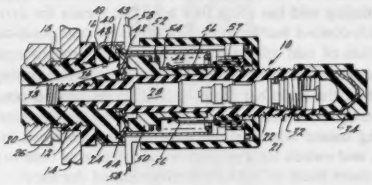
1. A rocker-type precision switch comprising: first and second housing elements interconnected to form a hollow casing, said housing elements defining first and second bearing surfaces; a rocker element including a manually engageable portion, and having a cylindrically-shaped portion defining a third bearing surface carried by said first and second bearing surfaces; said rocker element having a cam portion thereon defining camming surfaces; a pair of first and second contact elements selectively abuttable to complete an electrical circuit, one of said contact elements including a resilient member continuously urged against said cam portion, said cam portion serving as vibration damping means when said contact elements are in open condition; and at least one generally U-shaped over center spring element interconnecting said casing element with said rocker element to detent said rocker element selectively in either of two rotational positions; said U-shaped spring element including a first end having a notch therein, said rocker element having a notch therein engaging said first end, said last mentioned notch having a projection thereon corresponding to and engaging said notch in said first end of said spring element to prevent relative movement therebetween along an axis parallel to the axis of rotation of said rocker element.

4,117,281

COMBINATION TIRE PRESSURE MONITORING SWITCH AND INFLATION VALVE

Richard C. Leimbach, Durham, N.C., assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 8, 1977, Ser. No. 775,663
Int. Cl.[2] H01H *35/24*
U.S. Cl. 200—61.25 **4 Claims**



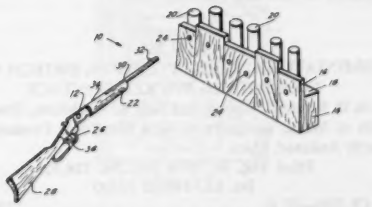
1. An inflation valve and pressure switch for a pneumatic tire mounted on a wheel rim, comprising a body portion attached to said rim and extending through an aperture formed in said rim, said body portion having a first longitudinal bore formed therethrough, an elongated cylindrical stem member received in said first bore, said stem member having a second longitudinal bore formed therethrough opening at one end to the interior of the tire; a normally closed inflation valve received in the other end of said second bore; a cover member attached to said body and defining an annular chamber between said cover member and said stem member; a diaphragm attached to said body portion within said chamber, said diaphragm having one face exposed to the pressure within said annular chamber; a duct formed within said body, said duct communicating at one end and with the interior of said tire, and at the other end opening under the opposite face of said diaphragm to expose said opposite fact to the pressure within said tire; an annular plunger received over said stem; an electrical contact ring received over said plunger and attached thereto; first and second electrical contacts attached to said stem member in electrically insulated relationship to each other and in sliding contact with said plunger; and spring biasing means received within said chamber to bias said plunger into engagement with said diaphragm, said diaphragm being operable to move said plunger along said stem to bring said electrical contact ring into engagement with said electrical contacts when said opposite face of said diaphragm is exposed to a first pressure and to bring said ring out of engagement with said electrical contacts when said opposite face of said diaphragm is exposed to a second pressure.

4,117,282

SWITCH TIME-DELAY MECHANISM FOR TOY GUN

Michael Ieda, Ft. Solanga, N.Y., assignor to Ideal Toy Corporation, Hollis, N.Y.

Filed Feb. 22, 1977, Ser. No. 770,885
Int. Cl.[2] H01H *7/08*; F21L *13/00*; A63F *9/02*
U.S. Cl. 200—33 R **18 Claims**



13. In a toy gun for use in a target shooting game, said gun including a housing, a light source in said housing, a power supply connected to said light source, normally open switch

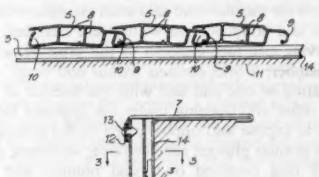
means operatively connected between said power supply and light source; and switch control means for closing said switch means for a short predetermined period of time thereby to produce a short burst of light of predetermined duration, wherein the improvement comprises said switch control means including an elongated switch control bar slidably mounted in said housing for movement between first and second positions with respect to said switch and being located to contact and close said switch during a predetermined portion of the bar's movement between its first and second positions; spring means for biasing said bar to its first position; means for driving said switch control bar from its first to its second position against the bias of said spring means; and inertia means operatively engaged with said slide bar and driven thereby during movement of the slide bar from its first to its second position for resisting movement of said slide bar under the bias of said spring means whereby the slide bar is maintained in contact with said switch for a predetermined period of time to produce said short burst of light of predetermined duration.

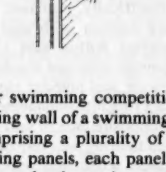
4,117,283

SWIMMING POOL TOUCH PAD CONSTRUCTION

Peter Hurzeller, Bellach, and Louis Degiez, Neuveville, both of Switzerland, assignors to Societe Suisse pour l'Industrie Horlogere Management Services, S.A., Bienne, Switzerland

Filed Oct. 14, 1976, Ser. No. 732,256
Int. Cl.[2] H01H *35/00*
U.S. Cl. 200—52 R **4 Claims**





1. A touch pad for swimming competitions adapted to be mounted on the finishing wall of a swimming pool, comprising:

a striker plate comprising a plurality of elongated hollow vertically extending panels, each panel having along one longitudinal edge a hook portion and along the other longitudinal edge an opening for loosely receiving and interlocking the hook portion of an adjacent panel, while permitting limited free movement of each panel independently of its adjacent panels in a direction transverse to the length of said longitudinal edge; and,

at least one elongated cable-like electrical contact switch extending transverse to said panels and positioned between said panels and said finishing wall whereby said contact switch may be closed by pressing any of said panels toward said finishing wall.

4,117,284

SUBMINIATURE, THREE POSITION, SWITCH WITH NON-SLIDING ROCKER CONTACT

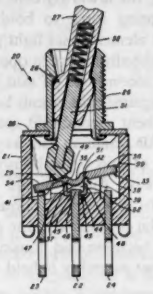
Francis D. Kirchoff, Waban, and Ellis K. Washburn, Tewksbury, both of Mass., assignors to Alco Electronic Products, Inc., North Andover, Mass.

Filed Aug. 30, 1976, Ser. No. 718,521
Int. Cl.[2] H01H *13/00*
U.S. Cl. 200—67 G **10 Claims**

1. A subminiature, three position, switch of the type having a switch box, a moveable see-saw contact, a central common terminal, a pair of opposite end terminals and a spring plunger actuator rod for rocking said see-saw contact into ON-OFF-ON positions,

said switch characterized by a U-shaped support in electrically conductive contact with the inside end of said central, common terminal; said support having a pair of upstanding legs, separated by a space, each leg having an upper edge on an opposite side of said common terminal and free of tab guides;

said moveable, see-saw contact having a central, laterally extending, half-cylindrical groove therein, for receiving the tip of said actuator rod in central OFF position;



said moveable contact having a rib, corresponding to, and opposite to, said groove, on the under face thereof, extending into the space between said legs and,

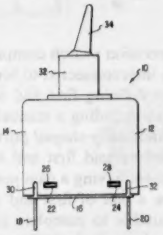
said contact being free of integral, laterally extending side tabs and having a pair of laterally extending grooves, in the said under face thereof; each located above one of the said upstanding legs of said U-shaped support for receiving the same when said moveable contact is tilted into ON position on that side of said common terminal.

4,117,285

SNAP ACTION CIRCUIT BREAKER

George Sullivan Harper, Cambridge, Md., assignor to Airpax Electronics Incorporated, Cambridge, Md.

Filed Aug. 19, 1977, Ser. No. 826,060
Int. Cl.[2] H01H *5/00, 9/02*
U.S. Cl. 200—76 **34 Claims**



1. A circuit breaker comprising an electrically insulating plastic housing, and overcurrent trip coil and armature in said housing, a stationary and a movable contact in said housing, a latch mechanism coupled to said movable contact for manually moving it between contacts open and contacts closed positions, said latch mechanism having a sear for collapsing it in response to movement of said armature, means coupled to said movable contact for opening and closing said contacts with a snap action, a handle link coupled to said latch mechanism, said case having a handle opening communicating with said handle link, and a handle passing through said opening and coupled to said handle link, the pivot axis of said handle link lying at least substantially in a central transverse plane through the shorter

dimension of said circuit breaker case with said handle opening symmetrically located in said case.

4,117,286

ELECTRIC SWITCH

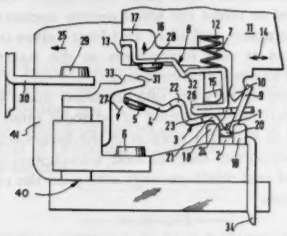
Arnold Methner, Tuttlingen, and Reinhold Mesle, Aldingen, both of Germany, assignors to J. & J. Marquardt, Germany

Filed Jun. 7, 1976, Ser. No. 693,154

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1975, 2526485

Int. Cl.[2] H01H *15/18*

U.S. Cl. 200—76 **11 Claims**



1. A push button actuated electric switch comprising, in combination, at least one substantially angular movable contact element having a pair of angled legs interconnected at a bend; a support; the outer surface of said bend bearing on said support; at least one fixed contact engageable by one leg of each movable contact element; a push button switch actuator movable rectilinearly of each movable contact element in a contact element displacement direction; a swivel member swingably mounted on said push button actuator and bearing against that side of said one angled leg opposite to the side facing the associated fixed contact and at a distance from said bend; loading spring means engaged between said swivel member and said push button actuator and biasing said swivel member against each movable contact element; said swivel member being movable, relative to said push button actuator, transverse to such contact element displacement direction of said push button actuator and against the bias of said loading spring means; said swivel member being movable, as a unit with said push button actuator, rectilinearly of said one leg of each contact element, upon rectilinear movement of said push button actuator in a contact closing direction, to slide along said one leg and pivot each movable contact element to engage the associated fixed contact; additional electric contact means operable by such swingable and transverse movement, of said swivel member relative to said push button actuator, responsive to further displacement of said push button actuator in such contact closing direction subsequent to engagement of each movable contact element with the associated fixed contact; and means on said push button actuator operable, when said push button actuator is displaced in the contact opening direction, to engage the other leg of each movable contact element to pivot the movable contact element to disengage its one leg from the associated fixed contact.

4,117,287

COMBINED ELECTRICAL-HYDRAULIC CONNECTOR MEANS

Raymond W. Walker, Huntington Beach, and Robert M. Beard, Long Beach, both of Calif., assignors to Compagnie Francaise des Petroles, Paris, France

Filed Apr. 11, 1977, Ser. No. 786,219

Int. Cl.[2] H02B *35/38*

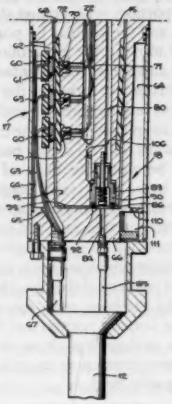
U.S. Cl. 200—82 R **11 Claims**

1. A combined electrical-hydraulic connector having a longitudinal axis, comprising:

means including separable, elongated body members for making and breaking electrical contacts by movement of at least one contact on one body member in a direction away from and toward said longitudinal axis;

means for conducting fluid parallel to said longitudinal axis and through said separable body members,

said body members providing a separable joint means transverse to said longitudinal axis;



seal means at said separable joint means for said fluid conducting means;

said seal means being adapted to be energized into a selected compressive state to seal said joint means for passage therethrough of fluid;

and fluid actuating means for making and breaking said electrical contacts and for energizing and de-energizing said seal means for said joint means.

4,117,288

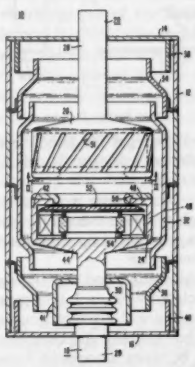
VACUUM TYPE CIRCUIT INTERRUPTER WITH A CONTACT HAVING INTEGRAL AXIAL MAGNETIC FIELD MEANS

Joseph G. Gorman, Murrysville; James F. Roach, Oakmont, both of Pa., and Paul O. Wayland, Montour Falls, N.Y., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 25, 1976, Ser. No. 699,770

Int. Cl.[2] H01H *9/44, 33/18*

U.S. Cl. 200—144 R **7 Claims**



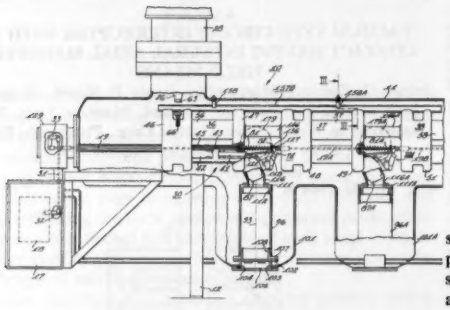
1. A vacuum type circuit interrupter which includes a housing which is sealingly evacuated, with a pair of relatively movable contacts sealingly supported within the housing,

which contacts are movable between a closed position in conductive engagement, and an open position spaced apart to form an arcing gap therebetween across which an arc forms during circuit interruption, the improvement wherein the contacts comprise a conductive base portion connected to a conductive support rod which sealingly extends through the housing, which base portion includes a cup-shaped side wall portion extending toward the opposed contact with a radially inwardly directed annular lip portion at the extending end of the cup-shaped side wall portion, with angled slots formed in the cup-shaped side walls and the annular lip portion to provide an arc rotating force for moving the arc around the annular lip portion, and wherein an annular solid contact rim is provided over the slotted lip portion to serve as the initial arcing surface when the contacts are separated, and wherein a disc-like contact portion is supported within the chamber defined by the cup-shaped side walls and lip of the base portion, by support means extending between the back of the disc-like contact portion and the base, with axial magnetic field producing means disposed within the chamber between the back side of the disc-like contact portion and the base, wherein the axial magnetic field producing means comprises a pair of half-turn conductive coil pieces which are each connected at one end to the back perimeter portion of the disc-like contact portion and at the other end to the base, with the coil pieces spaced between the disc-like contact portion and the base, with the coil piece connections arranged such as to provide a common circular current flow direction as to each contact to provide an additive axial magnetic field.

4,117,289
SINGLE TANK MULTIBREAKER CIRCUIT INTERRUPTER

Maurice J. Taylor, Florence; Henry L. Peek, Brandon; John J. Abdou, Brandon, and Amrut R. Patel, Brandon, all of Miss., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Continuation of Ser. No. 635,158, Nov. 24, 1975, abandoned.
This application Oct. 19, 1977, Ser. No. 843,457
Int. Cl.[2] H01H *33/82*
U.S. Cl. 200—148 B **2 Claims**



1. A multi-interrupter gas insulated circuit breaker;
a grounded enclosure having an insulating gas at a relatively low pressure therein;
a high pressure gas storage tank having insulating gas at relatively high pressure therein for each of the interrupters, said storage tanks being supported in a vertical plane within said enclosure
a forward shield casting and a rearwardly disposed shield casting; associated with each interrupter;
an insulating cylindrical contact housing for each of said interrupters horizontally disposed within said enclosure and secured between associated forward and rearward shield castings, said housing operating to enclose an associated interrupter;
a blast valve associated with each interrupter and connected to an associated high pressure gas storage tank, said blast valve including an angular housing in which said blast valve is disposed, said housing being operably connected between an associated interrupter housing and an associated high pressure gas storage tank to provide a gas flow path therebetween, said blast valve being normally operable to block the flow of high pressure gas from said high pressure storage tank, said blast valve being operable when actuated to release a blast of high pressure gas from the storage tank and said housing operates to direct the blast of high pressure gas to the arcing area of the associated interrupter confined within said contact housing;
a movable operating means within said enclosure and extending through said cylindrical contact housings and said shields associated with said interrupters and operably connected to effect the simultaneous operation of all of said interrupters and all of said blast valves to effect arc extinctions at said interrupters as the interrupters are operated to open positions; and,
means extending between said rearward shield casting and the forward shield casting of adjacent interrupters and operable to relieve a portion of the forces acting on the free unsupported ends of said interrupters due to the weight of said shield castings acting on the cantilevered interrupters.

4,117,290
STATIONARY CONTACT COMBINATION

Frank W. Kussy, Randallstown; Claudius C. Elmore, Jr., Timonium, and Richard E. Molesworth, Westminster, all of Md., assignors to Gould Inc., Rolling Meadows, Ill.

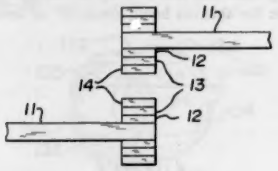
Filed Dec. 15, 1977, Ser. No. 860,847
Int. Cl.[2] H01H *1/06, 1/20*
U.S. Cl. 200—243 **11 Claims**

1. A contact combination for an electrical switching device, said combination including a stationary contact arm, a contact positioned at a front section of said arm and mounted on a first surface thereof, an aperture through a rear section of said arm, a retainer constructed of spring metal, said retainer including rear and front portions, said rear portion including spaced arms between which said rear section is sandwiched with said aperture in alignment with aperture means of said rear portion, fastening means extending through said aperture and aperture means for connecting said combination in a circuit, said front portion being offset from said rear section in a first direction away from a second surface of said arm which is opposite said first surface of said arm, said front portion and said front section cooperating to form therebetween a forward portion of a recess means, said retainer also including an intermediate portion disposed between said rear and front portions, said intermediate portion bounding another portion of said recess means extending away from said forward portion in said first direction, said recess means being constructed and operatively positioned to receive a complementary mounting formation of a contact carrier for mechanical securing of said combination in operative position on such carrier.

4,117,291
REED SWITCH

Bodo G. Gebauer, Algonquin, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed May 19, 1977, Ser. No. 798,735
Int. Cl.[2] H01H *1/02*
U.S. Cl. 200—268 5 Claims

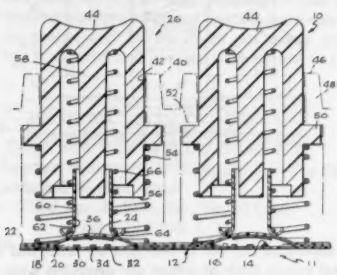


1. A reed switch comprising a sealed envelope, a pair of switch reeds and a pair of cooperating contacts each disposed on a corresponding end of each of said switch reeds wherein each of said contacts comprises an inner layer of palladium and an outer layer of ruthenium including an exterior surface of an oxide of ruthenium.

4,117,292
DUAL SPRING ACTUATOR FOR KEYBOARD SWITCH ASSEMBLY

James Christopher Hayes, and William James Tobin, both of Irvine, Calif., assignors to Telaris Telecommunications, Inc., Irvine, Calif.

Filed Jun. 10, 1977, Ser. No. 805,347
Int. Cl.[2] H01H *3/12, 13/70*
U.S. Cl. 200—340 12 Claims



1. A keyswitch assembly comprising:

a substrate having disposed on a surface thereof an electrical circuit defining at least one first switch contact at each of a plurality of switch regions;

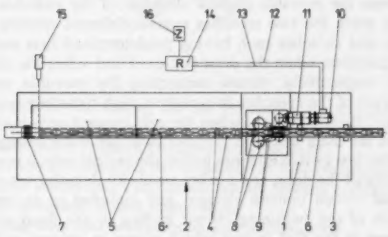
a switch carrier assembly including a plurality of second switch contacts, at least one being disposed at each switch region for switch closure engagement with a first switch contact in response to a switch actuation force; and

a switch actuator assembly disposed to selectively provide a switch actuation force at each switch region, the actuator assembly including for each switch region a follower disposed to engage the switch carrier assembly and transmit a switch actuation force to a second switch contact, the follower having a central aperture for slideably receiving a guide post; a key having central aperture with a guide extending therein, the key slideably receiving the follower within the aperture thereof with the guide post being received within the central aperture of the follower; a guideway being disposed to receive the key at a position proximate the switch region and to limit key motion between fixed limit points along a single axial direction; a first spring disposed in compression between the substrate and the key and tending to maintain the key at a first axial limit position spaced farthest from the substrate; a second spring disposed between the follower and the key to apply a minimum force therebetween when the key is at the first axial limit position and a maximum force therebetween when the key is at a second axial limit position spaced nearer the substrate, said second spring force providing the sole coupling force between the key and the follower, the coupling force being sufficient to cause switch closure when the key is at the second limit position and insufficient to cause switch closure when the key is at the first limit position.

4,117,293
METHOD FOR CONVEYING A ROW OF FORGING INGOTS THROUGH AN INDUCTIVE HEATING APPARATUS

Helmut Wicker, Herdecke; Werner Kielhorn, Essen-Steele, and Gerhard Heyduk, Dortmund-Scharnhorst, all of Germany, assignors to BBC Brown, Boveri & Company Limited, Baden, Switzerland

Continuation of Ser. No. 631,683, Nov. 12, 1975, abandoned.
This application Apr. 27, 1977, Ser. No. 791,244
Claims priority, application Fed. Rep. of Germany, Nov. 14, 1974, 2453940
Int. Cl.[2] H05B *5/06*
U.S. Cl. 219—10.41 1 Claim



1. The method of heating elongated forging ingots which comprises the steps of

progressively push feeding a continuous row of the ingots through an induction heater having sufficient length to effect simultaneous heating of all the ingots in the row from the rear charging end of the heater at which the feeding takes place to the front discharge end thereof and in conformity with a prescribed staying time determined by the inductive heating power so that the ingots in the row become progressively heated as they are fed through the heater from one end thereof to the other,

sensing the approach of the foremost ingot in the row to the discharge end of the heater and simultaneously therewith temporarily increasing the feed rate of the ingot row through said heater for a predetermined time period dependent upon the length of the fully heated foremost ingot thus to quickly remove such ingot from the discharge end of said heater,

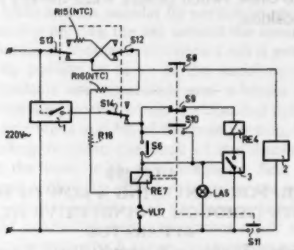
decreasing the feed rate of the ingot row upon expiration of said predetermined time period so as to cause the next-to-be discharged fully heated ingot at the head of the row to approach the discharge end at the proper time, and

temporarily stopping the feed of the ingot row through said heater in the event that said next-to-be discharged ingot should arrive at the discharge end of said heater prior to expiration of said prescribed staying time.

4,117,294
SAFETY ARRANGEMENT FOR MICROWAVE OVENS

Jan Olov Appelquist, and Conny Holger Lindwall, both of Norrkoping, Sweden, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 8, 1976, Ser. No. 693,944
Claims priority, application Sweden, Jun. 12, 1975, 7506751
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 C **7 Claims**

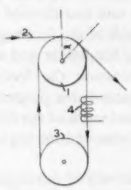


1. A safety interlock arrangement for a microwave oven having a door and a microwave generator, comprising a first switch controlled by the oven door and connected to interrupt the current supply circuit to the microwave generator of the oven upon opening of the door, a second switch also controlled by the oven door and connected to monitor the operation of the first switch, both switches having make-and-break contacts with fixed contact elements thereof mutually interconnected to form a switching circuit in which a current path between the movable contact elements of the switches only arises when the two switches assume different relative positions, said switches each having predetermined first and second positions when the door is closed and when the door is open, respectively, means connecting the movable contact elements of the switches in a current path including a circuit control element which, when the said current path is closed, makes the oven unusable, the two switches being arranged so that the first switch operates before the second switch upon the opening of the door, and a delay means for delaying activation of said circuit control element and included in an internal branch of the switching circuit leading to the fixed contact element in the first switch which comes in contact with the movable contact element thereof when the door is open.

4,117,295
APPARATUS FOR ANNEALING OF WIRE

Shirley Beach, North Vancouver, Canada, assignor to Phillips Cable Limited, Ontario, Canada

Filed Nov. 16, 1976, Ser. No. 742,177
Claims priority, application Canada, Nov. 17, 1975, 239815
Int. Cl.² H05B 5/08
U.S. Cl. 219—10.61 R **12 Claims**

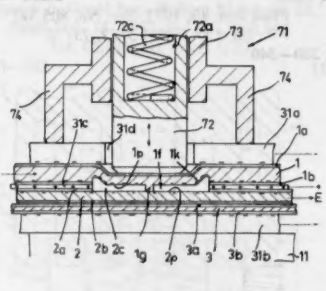


1. Apparatus for use during induction heating of wire comprising an upper sheave for supporting said wire around a first defined portion of the sheave periphery and for supporting said wire after induction heating around a second defined portion of said periphery, there being an overlap of the first and second portions, the improvement comprising a peripheral groove formed of insulating material around the rim of the sheave for simultaneously retaining both wires around said defined portions of the sheave, the width of the groove at a height ½ the wire width from the bottom supporting surface of the groove being from 1½ to less than 2 times the width of the wire, the apparatus being such that said overlap of said defined portions as measured on the sheaves being about 45° or less.

4,117,296
PROCESS AND APPARATUS FOR WELDING SHEET METAL COATED WITH LAYERS

Otto Alfred Becker, Robert-Koch-Strasse, 59, 66 Saarbruecken 6, Germany

Division of Ser. No. 445,109, Feb. 25, 1975, Pat. No. 4,009,362, which is a division of Ser. No. 181,149, Sep. 16, 1971, Pat. No. 3,798,407, which is a continuation-in-part of Ser. No. 823,077, May 8, 1969, Pat. No. 3,614,375. This application Feb. 18, 1977, Ser. No. 770,238
Claims priority, application Fed. Rep. of Germany, May 8, 1968, 1765366; May 28, 1968, 1765489; Aug. 19, 1968, 1765970; Sep. 3, 1968, 1790058; Jan. 17, 1969, 1902569; Sep. 17, 1968, 1790142
Int. Cl.² B23K 9/28
U.S. Cl. 219—91.21 **7 Claims**



1. An apparatus for the connection by electrical fusion of sheet metal panels both of which are provided with a coated insulating layer disposed between said sheet metal panels when said sheet metal panels are superimposed, and wherein the coatings are stripped in areas adjacent the welding zone, the improvement comprising:

(a) a recess formed in the inner surface of one of said panel members in said stripped area, and a welding pin extending centrally downwardly in the stripped area from said one member toward but spaced from the other panel member;

(b) capacitor plates positioned adjacent the outer surface of said panels, the upper one of said plates being formed with an opening generally concentric with the stripped areas of said panels,

(c) further capacitor means positioned between the adjacent, coated surfaces of said panels,

(d) pressure means extending through said opening in said upper plate and contacting the outer surface of said panel member formed with said recess, and

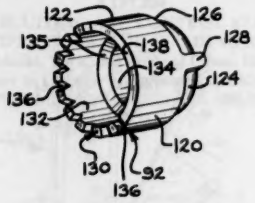
(e) means for applying welding current to said panels and substantially simultaneously actuating said pressure means to force the same downwardly whereby said welding pin engages the stripped area of the other of said panels whereby said pin, and thus said one panel, are welded to said other panel.

4,117,297

FERRULE FOR STUD WELDING

Roger W. Sholle, Lorain, Ohio, assignor to TRW Inc., Cleveland, Ohio

Continuation-in-part of Ser. No. 590,623, Jun. 26, 1975, abandoned. This application Nov. 22, 1976, Ser. No. 743,865
Int. Cl.² B23K 9/32
U.S. Cl. 219—98 12 Claims



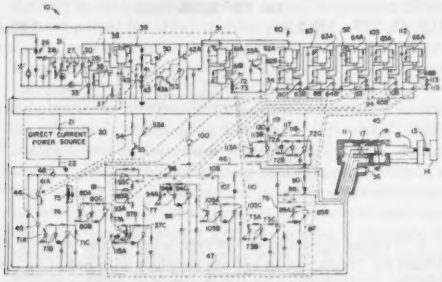
1. A ferrule for use in welding a stud to a workpiece by a drawn-arc welding technique said ferrule comprising a ceramic body having a front face, an outer front wall near the front face, an inner front wall near the front face and spaced substantially uniformly from said outer wall, and an inner rear wall forming a passage therethrough of smaller transverse cross section than that of said inner front wall, a plurality of substantial uniformly-spaced notches in said front face, extending from the outer front wall through to the inner front wall, and extending around from one-half to three-fourths of said front face, the remainder of said front face being arcuate and substantially unvented from the last of said notches at one end of the plurality to the last of said notches at the other end of the plurality, and said ferrule having orienting means thereon positioned symmetrically with respect to said remainder of said front face to enable said ferrule to be positioned with said remainder in a predetermined position with respect to a ferrule holder.

4,117,298

CONTROL FOR WELDING DEVICE

Robert J. Raycher, Brunswick, Ohio, assignor to Tru-Fit Products Corporation, Medina, Ohio

Filed Apr. 5, 1976, Ser. No. 673,428
Int. Cl.² B23K 9/20
U.S. Cl. 219—98 13 Claims



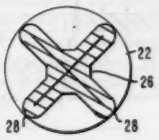
1. A control for a welding device, comprising in combination: a direct current power source having a first and second terminal; a welding circuit including first connection means connecting said first terminal of said power source to the electrode and second connection means connecting said second terminal of said power source to the workpiece with welding switch means interposed in one of said first and second connection means for controlling welding current in said welding circuits; a commutating circuit comprising commutating capacitor means and commutating switch means connected to said welding switch means for commutating said welding switch means upon conduction of said commutating switch means; a charging circuit including charging switch means connecting said commutating capacitor means between said first and second terminals of said power source, means for initiating conduction of said charging switch means to charge said commutating capacitor means with said direct current power source; means for initiating conduction of said welding switch means to establish welding current between the electrode and the workpiece; means for initiating conduction of said commutating switch means for discharging said commutating capacitor means to terminate conduction of said welding switch means; and means responsive to the termination of conduction of said welding switch means effective to reactivate said charging circuit and charge said commutating capacitor means.

4,117,299

METHOD OF TIPPING REFRACTORY METAL TUBULATION

John Petro, Belleville, and Charles R. Schofield, Bloomfield, both of N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 17, 1977, Ser. No. 769,600
Int. Cl.² B23K 11/00
U.S. Cl. 219—117.1 4 Claims



1. A method for sealing off the refractory metal exhaust tubulation of a ceramic arc tube containing a rare gas at less than atmospheric pressure comprising the steps of:

simultaneously crimping the tubulation at four equidistantly spaced points about its circumference thereby collapsing said tubulation in said crimp area;

disposing only said tubulation in an enclosed area;

flowing an inert gas at a pressure in excess of the pressure of said rare gas within said tubulation through said enclosed area;

contacting said tubulation with a pair of electrical contacts at spaced locations approximately equidistant on each side of said crimp; and

passing a predetermined electrical current between said contacts through said tubulation to thereby cause said tubulation to separate at approximately the midpoint of said crimp to form a seal at the separated ends.

4,117,300

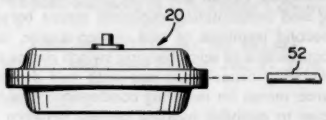
REDUNDANT WELDING METHOD FOR METAL BATTERY CONTAINERS

Charles R. Ricards, Emporium, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Apr. 5, 1977, Ser. No. 784,789
Int. Cl.² B23K 27/00
U.S. Cl. 219—121 LM 4 Claims

4. In a method of providing an hermetic seal between metal bodies each having a longitudinal axis and a flange extending in a direction transverse to said longitudinal axis, one of said flanges being provided with a depending notch, the steps comprising: mating said flanged bodies with said flanges coextensive;planar resistance welding aid bodies together through said flanges in substantially all areas except that including said depending notch, crimping said notch shut; spot welding said crimp by beginning at the center thereof an progressively

working outwardly to the ends of said crimp, each of said spot welds overlapping its neighbor; and subsequently peripherally



laser welding the edges of said flanges to effect a redundant weld separate and distinct from said planar resistance weld.

4,117,301

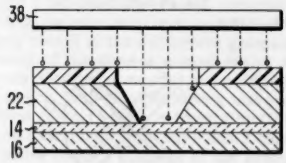
METHOD OF MAKING A SUBMICROMETER APERTURE IN A SUBSTRATE

Jitendra Goel, Kendall Park; Subrahmanyam Yegna Narayan, Belle Mead, both of N.J., and Ira Drukier, New York, N.Y., assignors to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 597,763, Jul. 21, 1975, abandoned. This application Aug. 8, 1977, Ser. No. 822,540

Int. Cl.[2] B23K *9/00*

U.S. Cl. 219—121 EM **10 Claims**



1. A method of making a submicrometer aperture in a substrate comprising the steps of:

placing at least one metallic layer adjacent a surface of said substrate,

selectively protecting said metallic layer so that only a portion of said metallic layer is exposed, said portion being adjacent the desired location of said submicrometer aperture and having a predetermined width,

bombarding said exposed portion of said metallic layer with a beam of ions having an energy of about 600 electron volts or less so that an opening having a cross-section resembling an isosceles trapezoid is formed therein, said opening exposing a section of said substrate whereat the width of said opening is narrowest, and removing said exposed section of said substrate utilizing said metallic layer with said opening therein as a mask, said predetermined width being selected of narrow enough value such that said removing step forms said submicrometer aperture.

4,117,302

METHOD FOR FUSIBLY BONDING A COATING MATERIAL TO A METAL ARTICLE

Michael Earle, Mapleton, and Glenn H. Lenzen, Jr., Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation-in-part of Ser. No. 447,971, Mar. 4, 1974, abandoned. This application Jan. 24, 1975, Ser. No. 543,191

Int. Cl.[2] B23K *26/00*

U.S. Cl. 219—121 LM **9 Claims**

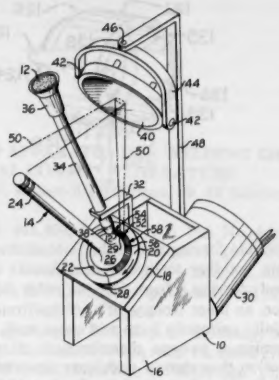
1. A method of fusibly bonding a substantially solid powder coating material to a metal article, which comprises:

Step (a) depositing the powder in the form of a band of powder onto a surface of the metal article, the band of powder being substantially uniformly levelled and of a preselected width;

Step (b) melting a portion of the band of powder by focusing a laser beam thereon;

Step (c) immediately thereafter melting the surface of the metal article by the heat of the laser beam on the band of powder at a heat interaction zone; and

Step (d) relatively moving the focused laser beam and the heat interaction zone along the band of powder at a rate sufficient for forming a traveling melt and maintaining heat transfer into the article and cooling of a trailing portion of the melt at preselected values and subsequent hardening of the trailing portion of the melt at a relatively



fixed distance from the heat interaction zone, the relative rate of laser beam movement and heat transfer being sufficient for providing a solidified surface layer having physical properties resulting essentially from heating and cooling of only the powder and a relatively thin, strong region of interstitial bond between the surface layer and the article having physical properties resulting essentially from heating and cooling of both the powder and the metal article.

4,117,303

ARRANGEMENT IN ELECTRICAL WELDING APPARATUS

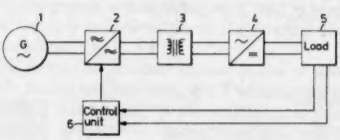
John Bengt Göran Hedberg, Gothenburg, Sweden, assignor to AB Svetsia, Askim, Sweden

Filed Apr. 26, 1977, Ser. No. 790,978

Claims priority, application United Kingdom, Apr. 28, 1976, 17214/76; Apr. 14, 1977, 17214/76

Int. Cl.[2] B23K *9/10*

U.S. Cl. 219—130.1 **5 Claims**



1. Welding apparatus of the type wherein the welding electrodes for producing an arc are supplied with pulsating direct current derived from an a.c. current supply by means of a controlled frequency converter which substantially increases the frequency of the alternating current, the output of said converter being connected through a transformer and a rectifier to the welding electrodes, wherein the connection between the rectifier and the welding electrodes includes a shunt capacitance having a preselected impedance which is of a low value so as to attenuate the alternating current components of the welding current to an audio level of at most 85 dB at frequencies up to 16,000 Hz, 95 dB in the frequency range of 16,000 to 20,000 Hz and 105 dB in the frequency range of 20,000 to 50,000 Hz, the said connection further comprising means for

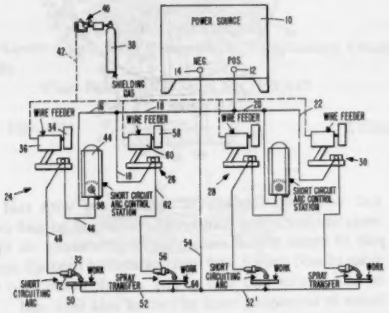
preventing the capacitor from adversely affecting the rectifier and frequency converter and a choke arranged between the capacitor and the electrodes to support the arc during recharge of the capacitor but for allowing discharge thereof during short circuit periods caused by droplets of molten welding material.

4,117,304

SHORT CIRCUITING ARC CONTROL STATION FOR MULTIPLE OPERATOR WELDING SYSTEM

Dale M. Wodzinski, York, and Michael Clissa, Hanover, both of Pa., assignors to Chemetron Corporation, Chicago, Ill.

Filed May 20, 1976, Ser. No. 688,454
Int. Cl.[2] B23K 9/10
U.S. Cl. 219—130.1 **5 Claims**



1. A welding system for providing welding current to both gas-metal arc spray transfer stations and short-circuiting arc stations from a single source of supply, comprising:

a common power source providing direct current power at a substantially constant potential, said potential being selected to accommodate the requirements of spray transfer welding but being unsuitable for short-circuiting arc welding;

a first operator station including a spray transfer welding gun and wire feeder means for supplying welding wire thereto;

first cable means connecting said spray transfer welding gun directly to said common power source to provide direct current power for spray transfer welding;

a second operator station including a short-circuiting welding gun and wire feeder means for supply welding wire thereto;

a short circuit arc control unit at said second operator station for selectively reducing the direct current potential of said common power source for said second operator station said arc control unit comprising an input and an output, a first resistor grid comprising a plurality of parallel-connected resistors connected in series between said input and output, a second resistor grid comprising a plurality of resistors, switch means in series with each resistor of said second resistor grid and selectively operable to connect selected resistors of said second resistor grid in parallel with said first resistor grid, and reactive means connected in series with said first resistor grid between said input and said output; whereby voltage disturbances from one of said operator stations are effectively isolated from the other of said operator stations; and

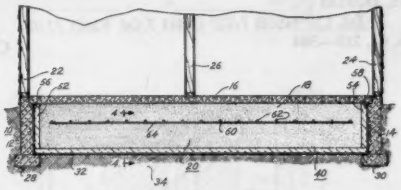
second cable means connecting said arc control unit in series between said commmon power source and said short-circuiting welding gun, said first and second operator stations being connected in parallel with each other across said common power source.

4,117,305

HEAT SUMP SYSTEM FOR BUILDING STRUCTURES

Jerrold L. Colten, Lakewille, Ind., assignor to Bristol Products, Inc., Bristol, Ind.

Filed Mar. 23, 1977, Ser. No. 780,368
Int. Cl.[2] H05B 1/00
U.S. Cl. 219—213 **9 Claims**



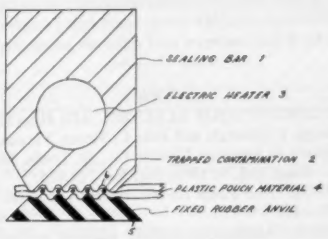
1. A heat sump system for building structures, comprising side walls defining an inner area with earth disposed beneath said area and supporting said side walls, heat absorbing and releasing fill material substantially filling said area and having an upper surface, a slab forming a floor of said building structure supported by said fill material on said upper surface forming a heat exchanging relationship with said fill material, an electrical heating cable for heating said fill material and said slab throughout substantially the full area of said material, a thin sheet of water impervious plastic material beneath said fill material, and a layer of thermal insulating material disposed between said fill material and said sheet of plastic material to form a heat flow barrier for minimizing the loss of heat from said fill material into the earth.

4,117,306

POUCH SEALING DEVICE

Jagdish Chandullal Shah, Stamford, Conn., assignor to International Telephone & Telegraph Corp., Nutley, N.J.

Filed Jul. 18, 1977, Ser. No. 816,425
Int. Cl.[2] H05B 1/00
U.S. Cl. 219—243 **1 Claim**



1. A pouch sealing device comprising:

a metallic pressure applying sealing bar having a sealing end with a plurality of longitudinal undulated grooves formed therein and spaced therealong to produce a corduroy-like surface on edges of a pouch to be sealed to enable visible detection of contamination in the seal after a sealing process has been completed;

an electric heater means disposed in said sealing bar to heat said sealing end; and

a fixed, stationary rubber anvil having a substantially flat surface upon which said edges of said pouch to be sealed is placed and said sealing bar is applied with pressure against said edges of said pouch to be sealed to the extent that said substantially flat surface of said rubber anvil is deformed to assume the shape of said undulated grooves.

4,117,307
CONTROL SYSTEM FOR CHARGING AND DISCHARGING AN ELECTRIC STORAGE HEATER

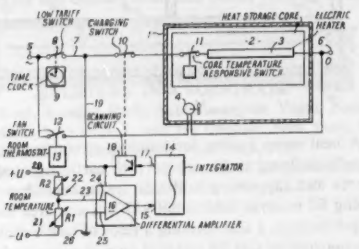
Poul Christian Carlos Iversen, Nordborg; Flemming Thorsoe, Sonderborg, and Borge Bernhard Hanson, Augustenborg, all of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Aug. 24, 1976, Ser. No. 717,250

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1975, 2539165

Int. Cl.[2] H05B *1/02;* F24H *7/04;* F24D *11/00*

U.S. Cl. 219—364 7 Claims



1. Charging apparatus for an electric storage heater comprising a heat storage core, a resistance heater for heating said core in series with a clock operated time switch and a charging switch, an integrator, means responsive to the output of said integrator for opening and closing said charging switch below and above respectively a predetermined potential output value of said integrator when said time switch is closed, analog sensing means for sensing at least one environment temperature value and outputting a potential which corresponds quantitatively to said value, differential amplifier means driven by said analog sensing means for charging or discharging said integrator in quantitative correspondence to said value when said time switch is open, said differential amplifier means having first and second inputs, said sensing means including a room temperature voltage divider which includes a temperature responsive resistance and is between conductors of different potentials, said sensing means having the tapping thereof connected to said first differential amplifier means input, said second differential amplifier means input being connected to a potential which falls between said different potentials.

4,117,308
EXPLOSION-PROOF ELECTRIC AIR HEATER

Alben C. Boggs, Pittsburgh, and John C. Stover, Verona, both of Pa., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Aug. 9, 1976, Ser. No. 712,823

Int. Cl.[2] H05B *3/02;* F24D *15/00;* F24H *3/06;* H01C *1/082*

U.S. Cl. 219—365 6 Claims

1. An electric heater, particularly adapted to heat air in hazardous area, comprising:

a tubular, sheet-metal casing,

a motor-driven fan for moving air axially through said casing,

a heat-radiating member disposed within said casing in position crosswise of the latter, said member being in the form of a metal casting and having an electric heat-generating element embedded therein,

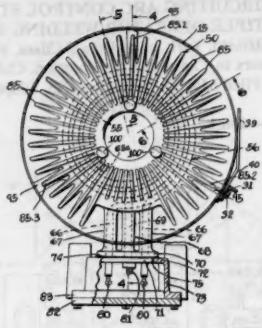
said radiating member having an annular central hub and a plurality of integral fins extending radially thereof,

a pair of legs integral with and extending radially of said central hub and having integral foot means at the ends thereof, the terminal ends of said heat generating element being embedded within respective legs and having terminal extremities extending outwardly from said legs and said foot means,

a metal terminal box having an opening in a wall thereof, said terminal extremities extending through said opening and into said box,

said foot means being welded to said terminal box to seal the opening therein,

three feet extending radially beyond said fins and equally spaced apart, each foot having an outer surface abutting the inner surface of said casing to maintain said heat-radiating member centrally disposed within said casing



and with said fins out of engagement with said casing inner surface, each foot being connected to said casing,

a pair of metal angles extending longitudinally on opposite sides of said casing, and bolts extending through apertures in said angles and said casing and threaded into tapped holes in respective ones of two of said feet, and

mounting means connected to respective angles, for mounting said electric heater on a support.

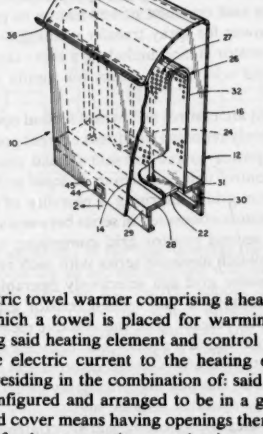
4,117,309
ELECTRIC TOWEL WARMER

Michael Paul Cayley, 94 Watergate, S. Barrington, Ill. 60010

Filed Jul. 26, 1976, Ser. No. 708,572

Int. Cl.[2] H05B *1/00, 3/02;* F26B *9/00, 25/06*

U.S. Cl. 219—385 9 Claims



1. In an electric towel warmer comprising a heating element adjacent to which a towel is placed for warming the same, means covering said heating element and control circuitry for controlling the electric current to the heating element, the improvement residing in the combination of: said heating element being configured and arranged to be in a generally upright plane, said cover means having openings therein to facilitate heat transfer by convection, conduction, and radiation from said heating element through said cover means and being sized and arranged to fit over said heating element in spaced relationship thereto in a generally upright position for supporting a towel draped thereover; said towel warmer including a

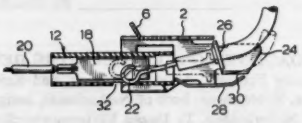
housing completely surrounding said heating element and said cover means, said housing having spaced apart end walls and sidewalls, an open bottom and an openable top closure with said heating element being mounted on a base within said housing with said base closing off the bottom of said housing, said cover means extending between said end walls and being situated between and spaced from said sidewalls, such that a towel received in said housing through said openable top closure and draped over said cover means has one portion situated between one sidewall and said cover means and another portion situated between the other sidewall and said cover means, and said control circuitry including means within said cover means in circuit with said heating element for maintaining the temperature within said housing at a temperature adequate to warm a towel in said housing.

4,117,310

ELECTRICAL SOCKET

Andrew Greive Clark, 2414 Conquest Dr., Mississauga, Ontario, Canada

Filed Feb. 4, 1977, Ser. No. 765,549
Int. Cl.[2] H05B *3/08*
U.S. Cl. 219—451 **2 Claims**



1. In a socket assembly for a plug-in electrical heating element for a stove, comprising a socket member of rigid dielectric material defining horizontal sockets configured to receive contact members on the heating element and containing conductor elements resiliently engageable with said contact members, and a guide and carrier member which loosely and interlockingly embraces said socket member so as to support the latter whilst permitting a limited degree of pivotal and translational movement relative to the guide and carrier member, said latter member also defining the walls of a generally horizontally extending guide passage through which said contact members must be passed to reach the sockets in said socket member, the walls of said guide passage receiving and being engageable with a grounding and locating member on the heating element from which member the contact members project, the improvement in which inwardly projecting shelves are formed on the side walls of said guide passage having an inward and rearward extent such as to engage the bottom of the grounding and locating member and prevent it from approaching the bottom wall of the passage and the heating element from being lowered to a horizontal position until the contact members are fully engaged in the sockets and the grounding and locating member has passed beyond the rear ends of the shelves.

4,117,311

ELECTRIC WELDING MUFF

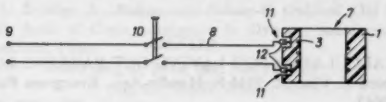
Werner Sturm, Hagendorf, Switzerland, assignor to Von Roll AG., Gerlafingen, Switzerland

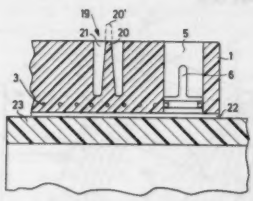
Filed Mar. 14, 1977, Ser. No. 777,467
Claims priority, application Switzerland, Mar. 22, 1976, 3535/76; Jan. 14, 1977, 481/77; Feb. 25, 1977, 2438/77
Int. Cl.[2] H05B *3/58*
U.S. Cl. 219—544 **13 Claims**

1. In an electric welding muff for thermally flowing to produce welded joints between generally tubular members, the muff being of the type comprising a thermoplastic synthetic resin sleeve with an electric resistance heating wire disposed adjacent the inner surface of the sleeve, and means on said wire for connection to a power source, the improvement wherein

said sleeve having a predetermined nominal diameter, said wire having a predetermined resistance,

said resistance and said diameter being so related that their product averages approximately 10,075 ohm-mm plus or





minus 20 percent, so that the value of the resistance decreases with increasing sleeve diameter,

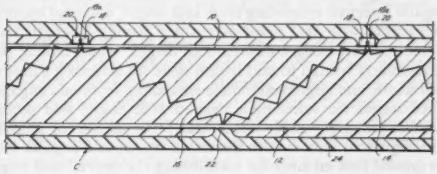
whereby the muff is operable with an unregulated source of power.

4,117,312

SELF-LIMITING TEMPERATURE ELECTRICAL HEATING CABLE

Ben C. Johnson, San Marcos; J. Scott Thornton, Austin; Donald E. Glowe, Austin; Patrick E. Cassidy, Austin, and Robert E. Anderson, San Marcos, all of Tex., assignors to Thermon Manufacturing Company, San Marcos, Tex.

Filed Jul. 22, 1976, Ser. No. 707,648
Int. Cl.[2] H05B *3/56*
U.S. Cl. 219—548 **14 Claims**



1. A temperature self-limiting electrical heating cable or tape to provide heat to pipes, tanks and the like, comprising:

(a) first conductor means and second conductor means for conveying electrical current extending in proximity to each other along the length of the cable;

(b) insulating means, comprising:

(1) insulating material mounted to enclose said first and second conductor means along the length of the cable and to insulate said first and second conductor means from each other; and

(2) said insulating material having portions thereof removed at intervals along the length of the cable to form slits and permit electrical contact with said first and second conductor means;

(c) a plurality of heating elements electrically connected between said first and second conductor means for producing heat when current flows therethrough; and

(d) variable resistance means comprising a plurality of chips of variable resistance heating material mounted in selected ones of said slits in said insulating material, each of said chips being electrically connected in series with selected ones of said plurality of heating elements between said

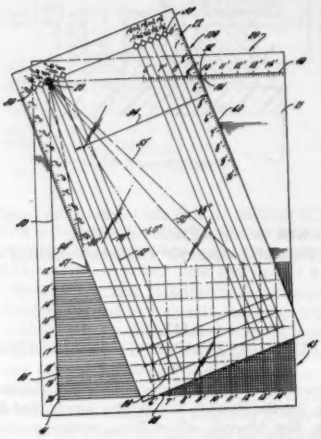
first and second conductor means, said chips of variable resistance heating material substantially increasing in resistance when a temperature limit is reached to reduce the current flowing through said heating elements and control the heat output of the cable.

4,117,313

CALCULATOR FOR LAYING OUT PARKING LOTS

Richard T. Vincent, 9144 S. Hamlin Ave., Evergreen Park, Ill. 60642

Filed Jan. 14, 1977, Ser. No. 759,261
Int. Cl.[2] G06C *3/00*; G06G *1/14*
U.S. Cl. 235—61 GM **6 Claims**



1. A calculator for laying out stalls in parking lots comprising a first member having first and second orthogonal numerical scales corresponding to stall length and width, pivot means at the origin of said scales, angular indicia at predetermined angular intervals emanating from said origin; a second member engageable with said pivot means and having a length scale thereon for selecting a desired stall length, width indicia perpendicularly related to said length scale for selecting a desired stall width, and alignment indicia emanating from said engaged pivot means for selecting a desired stall angle; said second member being pivotable about said pivot means for aligning said alignment indicia with a selected one of said angular indicia on said first member for establishing the desired stall angle, whereupon the length scale and width indicia on said second member intersect said length and width scales of said first member to read the orthogonal dimensions of stall length and width to achieve the desired stall length and width at the desired angle.

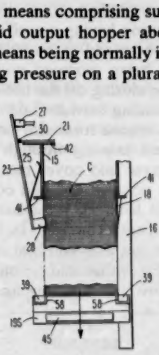
4,117,314

CARD READER WITH MEANS FOR UNLOADING OUTPUT HOPPER ON THE FLY

John C. Schisselbauer, Southampton, and John J. Dobson, Oreland, both of Pa., assignors to Peripheral Dynamics, Inc., Norristown, Pa.

Filed Jun. 8, 1976, Ser. No. 693,878
Int. Cl.[2] G06K *13/14*; B65H *31/12*
U.S. Cl. 235—475 **16 Claims**

1. In a card reader having input means for inputting cards into the reader, transport means for transporting them through said reader so that they can be read, and an output hopper wherein cards are collected after having been read, the output hopper having elevator means for supporting the cards collected in said output hopper and having the feature of being moveable, the invention comprising means enabling efficient unloading of said card reader while it is in continuous operation, said unloading means comprising support means for supporting cards in said output hopper above a predetermined level, said support means being normally inoperative and exerting inward clamping pressure on a plurality of said collected



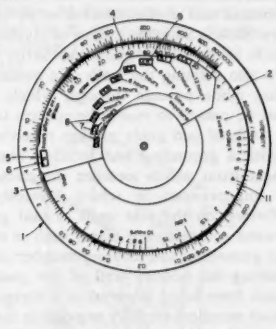
cards, and support enabling means for rendering said support means operable, whereby cards being read while said support means is operative are collected on a pile supported by said supported cards and the cards supported by said elevator below said supported cards are available for unloading.

4,117,315

RADIOACTIVE DOSE CALCULATING DEVICE

Cornelis Georg Frederik Ampt, Voorburg, and Keimpe Klaas Keimpema, Zoetermeer, both of Netherlands, assignors to De Staat der Nederlanden, Te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie, The Hague, Netherlands

Filed Feb. 7, 1977, Ser. No. 766,246
Claims priority, application Netherlands, Dec. 2, 1976, 7601448
Int. Cl.[2] G06C *3/00, 1/02*
U.S. Cl. 235—88 R **6 Claims**



1. A device for calculating radioactive doses and intensities comprising:

(A) a first part having:

(a) an outer scale for the intensity of Rontgens per hour,

(b) an aligned adjacent inner scale for the time in hours after the explosion,

(c) a plurality of aligned further inner scales of different dose factor values divided into three sections having visually different charactertistics for different percentage ranges of errors;

(B) a second part having:

(a) a first scale on an edge thereof for the dose factor cooperating with said intensity scale,

(b) a window cooperating with said time scale,

(c) a plurality of stepped windows for different exposure times, one corresponding to each scale of dose factor values, and

(d) a second scale on said edge thereof for indicating

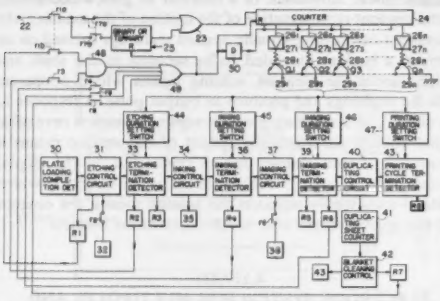
intensity at other times than that of the measurement, and cooperating with said intensity scale, and

(C) means for fastening said parts together for relative movement with respect to each other.

4,117,316
APPARATUS FOR CONTROLLING OPERATION CYCLE OF DUPLICATING MACHINE

Yoshinori Honkawa, Fuchu, Japan, assignor to Ryobi, Ltd., Fuchu, Japan

Filed Jun. 14, 1977, Ser. No. 806,433
Claims priority, application Japan, Jun. 14, 1976, 51-77828[U]
Int. Cl.[2] G06M *3/02*; G06B *27/06*
U.S. Cl. 235—92 SB **5 Claims**



1. An apparatus for controlling the operation cycle of a duplicating machine, said machine including plate loading means, etching means, inking means, imaging means and duplicating means, each complete operation cycle of the duplicating machine including, in succession, plate loading, etching, inking, imaging, and duplicating processes, comprising:

a plate loading completion detector for providing an output signal at the termination of said plate loading process;

a revolution detector for providing output signals at a frequency corresponding to the operating speed of the apparatus;

a counter for receiving and counting the output signals from said revolution detector;

a plurality of adjustable termination means, each said termination means being set to the desired duration of a respective one of said etching, inking, imaging and duplicating processes and each providing termination signals at the termination of its respective process;

switch means responsive to the output signals from said termination mean detectors for resetting said counter at the termination of each process and for disabling the means for the terminated process;

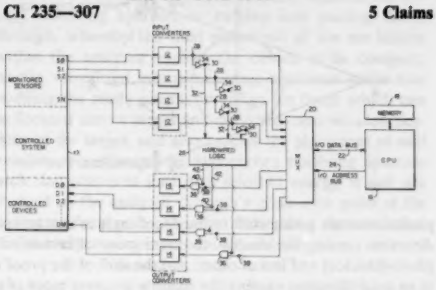
etching, inking, imaging and duplicating control circuits responsive to the output signals from said plate loading completion detector, etching, inking and imaging termination detectors, respectively, for energizing said etching, inking, imaging and duplicating means; and

a printing termination means for receiving the counter value and resetting said counter at the termination of each printing cycle.

4,117,317
PROGRAMMABLE CONTROLLER WITH HARDWIRED BACKUP CONNECTING TERMINALS AND RELATED CONTROL SYSTEM USING PROGRAMMABLE CONTROLLER AND HARDWIRED BACKUP

Philip G. Dooley, Jr., Bolton, and Sidney C. Oakleaf, Old Saybrook, both of Conn., assignors to Dynage, Incorporated, Bloomfield, Conn.

Filed Aug. 9, 1976, Ser. No. 712,885
Int. Cl.[2] G06F *9/00*
U.S. Cl. 235—307 **5 Claims**



1. An improved means for controlling a given operating system, said means including a plurality of sensors for monitoring given parameters of said system and for producing a plurality of monitored signals representative of said parameters, a plurality of controlled devices for varying given parameters of said system in response to a respectively associated plurality of control signals, a programmable controller including a memory programmable with a set of binary coded instructions and a processor for processing a plurality of binary data input signals in accordance with the set of instructions stored in said memory to produce a plurality of binary data output signals, a plurality of input converters for converting said monitored signals into binary data signals compatible with the remainder of said programmable controller, means for continually transmitting each of said binary data signals from said input converters to said processor as input signals for said processor, a plurality of output converters for converting said binary data output signals of said processor into a plurality of control signals compatible with said controlled devices, and means for continually transmitting said plurality of binary data output signals from said processor to said plurality of output converters with each of said output converters receiving a respectively associated one of said latter signals, and wherein the improvement comprises a hardwired logic circuit for converting a set of binary data input signals into a set of binary data output signals in accordance with a fixed logic scheme, means for continually supplying at least one of said binary data output signals from one of said input converters to said hardwired logic circuit as an input to said hardwired logic circuit, and means for continually supplying at least one binary data output signal from said hardwired logic circuit to one of said output converters as an input to said output converter in ORed relation to the input signal supplied to the same output converter by said processor.

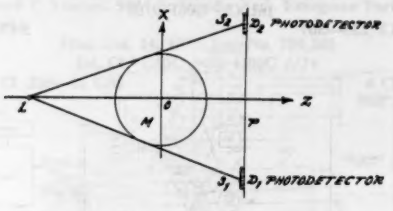
4,117,318
OPTICAL POSITION PICK-OFF IN ZERO-DRAG SATELLITE

Walter L. Pondrom, Jr., Fullerton, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 16, 1977, Ser. No. 797,143
Int. Cl.[2] G01J *1/20*
U.S. Cl. 250—201 **5 Claims**

1. In a zero drag satellite having a proof mass shielded from all effects except gravity, the improvement of an optical proof mass position pick-off comprising a flat screen in fixed relation-

ship to said satellite, a mutliplicity of photodetectors equally spaced on said flat screen, and a light source in fixed relationship to said satellite providing a light beam, said proof mass initially interposed in a null position between said flat screen and said light source with said proof mass interrupting said light beam to cast a circular shadow on said flat screen, the periphery of which passes through the center of each of said



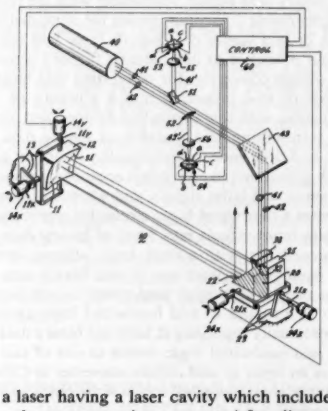
photodetectors with a shift in the proof mass in any transverse direction causing the shadow to cover more of certain of said photodetectors and less of other, and the shift of the proof mass in an axial direction causing the shadow to cover more of all of said photodetectors or less of all of said photodetectors, the unbalance of the photodetectors outputs being used for activation purposes to change the direction of the zero-drag satellite until the proof mass returns to the null position.

4,117,319

ALIGNMENT SYSTEM FOR LASERS

Frederic H. White, III, Simi, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jul. 5, 1977, Ser. No. 812,884
Int. Cl.[2] G01J *1/20*
U.S. Cl. 250—201 **13 Claims**



1. In a laser having a laser cavity which includes a convex mirror and a concave mirror mounted for alignment of their respective optical axis, the concave mirror being mounted in addition for tilting about two axes extending transversely to the optical axis of the concave mirror, the improvement comprising:

a concave extension of the concave mirror;

means for providing a collimated beam;

means including beam diverging means for directing the beam towards the concave mirror extension to be reflected by the extension and recollimated by the diverging means;

detection means disposed to be responsive to the recollimated beam to detect any displacement thereof from autocollimation on account of a relative lateral or tilting displacement between said mirrors and providing detection signals accordingly; and

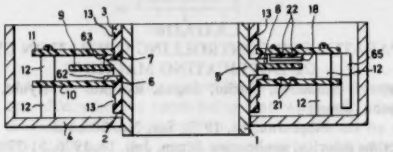
control means connected to the detection means for being responsive to the detection signals for correctively tilting the concave mirror.

4,117,320

DIGITAL MEASURING INSTRUMENTS

Ernest Valdur Tomlinson, and Charles Nicholas Carne, both of London, England, assignors to Carson (Instruments & Equipment) Limited, London, England

Filed Jun. 8, 1976, Ser. No. 693,984
Int. Cl.[2] H01J *3/14*
U.S. Cl. 250—237 G **14 Claims**



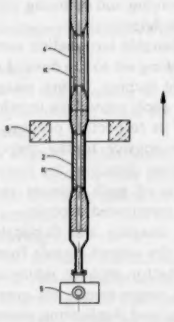
1. A digital instrument for cooperating with a shaft rotatable to cause linear movement of a member to give a continuous digital readout representative of the motion of the member, the instrument comprising equally spaced markings formed on an element, a bushing intended to be secured to the shaft and which carries the element, sensing means which cooperate with the markings and produce an output pulse in response to the passage of a marking past the sensing means, a reversible digital counter to which the output of the sensing means is connected, digital display means connected to the digital counter, and a casing which is intended to be fixed, which contains and fixedly supports the sensing means, the counter and the display means and which contains the element.

4,117,321

ELECTRODE SYSTEM FOR MULTIPOLES AND ESPECIALLY FOR MULTIPOLE OR MONOPOLE MASS SPECTROMETERS

Wilhelm Meyer, Bremen, Germany, assignor to Varian MAT Gesellschaft mit beschrankter Haftung, Bremen, Germany

Continuation of Ser. No. 586,992, Jun. 16, 1975, abandoned. This application May 23, 1977, Ser. No. 799,391
Claims priority, application Fed. Rep. of Germany, Jun. 18, 1974, 2429214; Jul. 16, 1974, 2434090
Int. Cl.[2] B01D *59/44;* H01J *39/34*
U.S. Cl. 250—292 **20 Claims**



1. Electrode apparatus for multipoles, including monopoles, especially for quadrupole mass spectrometers, with one or

more pole rods, which have electrically conducting pole surfaces, and with a hollow section serving as the seating for the pole rods, which are capable of being removed, comprising,

a pipe formed with a plurality of intersecting adjacent inside flat surfaces comprising said hollow section for seating each of said pole rods in contact with intersecting adjacent inside flat surfaces of said pipe in a predetermined precise relationship with said pole rods parallel to one another within a tolerance of a few micrometers, and said pole rods being fitted directly in contact with intersecting adjacent inside flat surfaces of said pipe whereby a line on the surface of each of said pole rods a predetermined distance from said inner surface is precisely parallel to the axis of said pipe to insure a resolution within the range around the mass number **1000** so that it is possible to separate completely adjacent integral mass numbers.

4,117,322

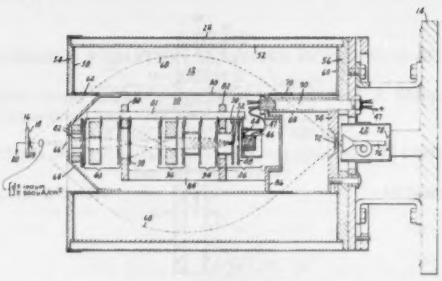
ION SCATTERING SPECTROMETER INCLUDING CYLINDRICAL MIRROR ANALYZER AND ION GUN AXIALLY POSITIONED THEREWITHIN

James T. McKinney, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation of Ser. No. 712,678, Aug. 9, 1976, abandoned. This application Nov. 28, 1977, Ser. No. 855,307

Int. Cl.[2] G01N *23/00*

U.S. Cl. 250—309 **10 Claims**



1. A device for analyzing a surface layer by means of ion scattering spectroscopy comprising

(a) means for producing a beam of primary ions having substantially a single mass and single energy directed along an axis of symmetry toward a target placed at a predetermined position on the axis, the surface of which target is to be analyzed;

(b) a cylindrical mirror analyzer comprising inner and outer cylindrical electrodes electrically insulated from each other and coaxially disposed about said axis, one of which electrodes is positioned inside the other to define a zone of substantially radial electric field therebetween when a potential is applied between the electrodes, the inner cylindrical electrode having means providing an annular entrance aperture positioned to allow ions scattered from said surface at a predetermined angle to enter into the radial field zone and to be deflected thereby, and means providing an exit annular aperture positioned to allow the deflected ions to pass therethrough out of the radial field zone whereupon those ions having a preselected energy are focused upon an axially located conjugate focal point for ions scattering from the target; and

(c) detector means for determining the ion current of such scattered ions as have said preselected energy, wherein

the ion beam producing means comprises an electron bombardment type ion source in which the generation and extraction of ions in said ion beam is accomplished in the absence of magnetic fields, said ion source including means for supplying electrons into said ionization chamber and a plurality of substantially cylindrical members for extracting said ions from said chamber and for accelerating and focusing said extracted ions into an axially directed beam, all of which ion source members are axially positioned within the inner cylindrical electrode of the analyzer, the analyzer further comprises an exit aperture plate positioned normal to the axis and substantially enclosing the end of the inner cylinder adjacent the exit annular aperture and having an energy resolving aperture at said conjugate focal point and the detector means comprises an ion detector axially positioned adjacent the energy resolving aperture to receive ions passing therethrough, whereby the axial placement of the ion source within the analyzer enables the device to be compact, readily retrofitted into pre-existing apparatus while also enabling the ready production of an ion beam which can be focused onto a target and deflected onto selected portions of the target, and also enables the placement of said ion detector adjacent the said energy resolving aperture such that scattered ions of a selected energy which are focused by the analyzer through a cross-over point at the conjugate focal point, thereby maximizing the resolution of the analyzer, impinge onto the detector.

4,117,323

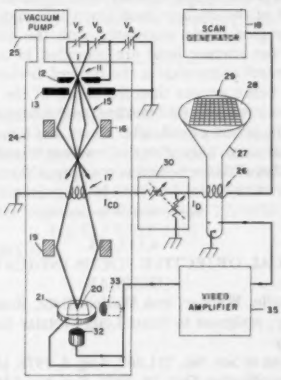
ELECTRON MICROSCOPES

Raymond Thomas Greer; Bradley Harold Vale, and David Michael Martin, all of Ames, Iowa, assignors to Iowa State University Research Foundation, Ames, Iowa

Filed Mar. 7, 1977, Ser. No. 774,869

Int. Cl.[2] G01M *23/00*

U.S. Cl. 250—311 **7 Claims**



1. In a beam microscope including means for generating and directing a beam toward a sample, a housing for said generating means and said sample; means for generating a vacuum in said housing; apparatus comprising: detector means including a semiconductor photodiode for sensing optical luminescence from said sample in response to the impingement thereon by said beam and for converting said sensed luminescence to a representative electrical signal; means for mounting said detector means in said vacuum housing immediately adjacent said sample whereby said luminescence falls directly on said photodiode; low-noise amplifier means in circuit with said photodiode for amplifying the signal generated by said photodiode in response to incident optical luminescence; means for mounting said amplifier immediately adjacent said photodiode within said vacuum housing; conductor means coupled to the output of said amplifier means for coupling said output electrical signal through said housing; and display means coupled to said conductor for generating a visual image responsive to said electrical signal.

4,117,324
CURVE FOLLOWER DEVICE

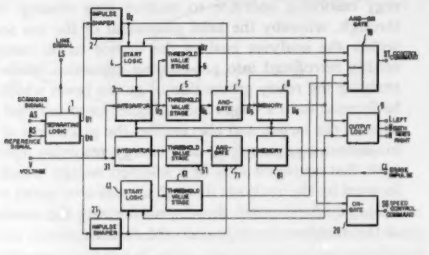
Erwin Francke, Munich, Germany, assignor to Erwin Sick Gesellschaft mit beschrankter Haftung Optik-Elektronik, Waldkirch, Germany

Filed Mar. 17, 1977, Ser. No. 778,608

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1976, 2618165

Int. Cl.² G05B *1/00*

U.S. Cl. 250—202 **12 Claims**



1. In a curve follower device having an optical scanner head circularly scanning a guide region containing a guide linc and separate code region provided at least on one side of the guide region, the measurement point of the head being a predetermined distance from its pivot point in the direction towards the guide line and the head being movable along the guide region at a speed considerably slower than the scanning speed and being connected to a control device which forms from the signals delivered by the scanner head, control signals for the movement of the scanner head along the guide line, while in the code region marks associated with the guide line as detected by the scanner head are provided in order to initiate further control commands in the control device, the length of the marks being greater than the width of the guide line, the improvement wherein said control device comprises means for stopping the scanner head, after the end of a mark in the code region is detected, only after the head has travelled a predetermined further distance which is not longer than the interval of the measurement point from the pivot point.

4,117,325
OPTICAL OBJECTIVE FOCUS INDICATOR AND DISPLAY

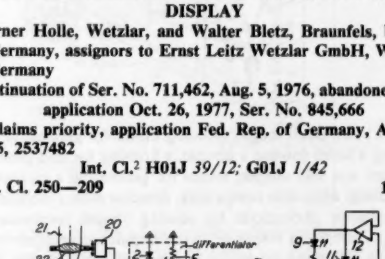
Werner Holle, Wetzlar, and Walter Bletz, Braunfels, both of Germany, assignors to Ernst Leitz Wetzlar GmbH, Wetzlar, Germany

Continuation of Ser. No. 711,462, Aug. 5, 1976, abandoned. This application Oct. 26, 1977, Ser. No. 845,666

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1975, 2537482

Int. Cl.² H01J *39/12*; G01J *1/42*

U.S. Cl. 250—209 **1 Claim**



1. In an apparatus comprising an optical objective, a scanning disk or a scanning plate and first and second photoelectric detectors all located along optical axes for indicating the focus of said optical objective which projects an image of an object onto said scanning disk or scanning plate for pupil division of the image into imaging beams, and projection of said imaging beams onto said photoelectric detectors, each of which generates an electrical impulse where a phase difference between said pulses is a measure of the degree of said focus of the objective, the improvement comprising first and second differentiators connected respectively to said first and second photoelectric detectors, a reset flip-flop having first and second input terminals connected respectively to said first and second differentiators and an output terminal, an integrator connected to said output terminal, an amplifier connected to said integrator, a first and a second light emitting diode, said first light emitting diode connected to said amplifier and said second light emitting diode connected to an inverter connected to said amplifier, a voltage follower connected to said first and second light emitting diodes, and means for photoelectrically measuring the object brightness, said means connected to said voltage follower for adjusting the median luminosity of said light emitting diodes in dependence on the object brightness.

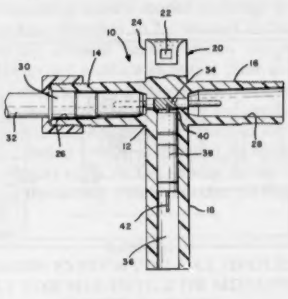
4,117,326
ION GENERATOR

Jan Philip Askman, Carlisle, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 25, 1977, Ser. No. 818,909

Int. Cl.² H01T *19/04*

U.S. Cl. 250—324 **5 Claims**



1. An ion generator comprising a substantially T-shaped housing having a pair of cross bar portions and a centrally depending leg portion, each said cross arm portion and said leg portion of said housing having a recess therein, a fixed pin contact interconnecting said recesses in said cross arm portions and adapted to engage electrical connectors inserted therein, a resistive element inserted into said recess of said leg portion electrically and mechanically engaging said pin, and means to fixedly mount said housing.

4,117,327
INFRARED DEVIATION MEASURING DEVICE

Pierre Marie Louis Lamelot, Ville d'Avray, and Roland Georges Mousson, Soisy sur Seine, both of France, assignors to Societe Anonyme de Telecommunications, Paris, France

Filed Jul. 5, 1977, Ser. No. 813,186

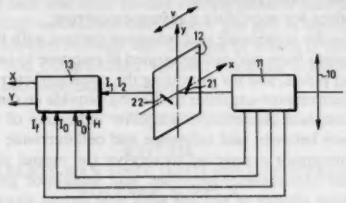
Claims priority, application France, Jul. 8, 1976, 76 20947; May 31, 1977, 77 16574

Int. Cl.² G01J *1/00*

U.S. Cl. 250—338 **5 Claims**

1. A deviation measuring device for localizing an infrared radiation source relative to an optical axis, comprising a focalization lens, a linear scanning device, two threadlike detectors non-parallel to the scanning direction and non-parallel therebetween in the focal plane of the lens and a processing circuit for deriving from the output signals of said detectors signals characteristic of co-ordinates X and Y of the source in a reference system centered on the optical axis, said scanning device com-

prising means for delivering pulses defining respectively a time origin and the end of a scanning period and a reference pulse



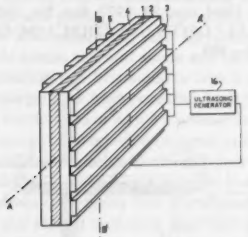
indicative of the arrangement of the threadlike detectors, said pulses being applied to the processing circuit.

4,117,328

INFRARED RADIATION SENSITIVE IMAGE PICK-UP DEVICE

Michel Joseph Auphan, Paris, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 4, 1977, Ser. No. 793,864
Claims priority, application France, May 26, 1976, 76 15986
Int. Cl.[2] H01J *31/49*
U.S. Cl. 250—330 **6 Claims**



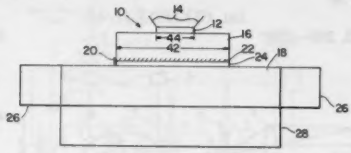
1. An infrared imaging device comprising first and second piezoelectric sheets of material each having a ferroelectric transition temperature for storing thermal information, means for point-wise reading said thermal image by point-wise conversion into electric readout signals, and means for exciting said piezoelectric material without loss of the piezoelectric properties thereof including a first strip electrode comprising parallel strips of electrically conductive material on one surface of said first sheet, means connecting said strips sequentially to an electrical pulse generator for introducing piezoelectrically stimulated ultrasonic vibrations in said first sheet, an electrically conductive foil on the other surface of said sheet, means to maintain said foil at a fixed electric potential, the second sheet of piezoelectric material being positioned parallel to the said foil and supporting on the surface remote from the first sheet a second strip electrode having strips in a direction differing from the direction of the strips of the first strip electrode, said strips being connected to a network comprising means for signal detection.

4,117,329

ROOM-TEMPERATURE, THIN-FILM, PBS PHOTOCONDUCTIVE DETECTOR HARDENED AGAINST LASER DAMAGE

Melvin R. Kruer, Oxon Hill, Md.; Leon Esterowitz, Springfield, Va.; Filbert J. Bartoli, Upper Marlboro, Md., and Roger E. Allen, Alexandria, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 22, 1977, Ser. No. 790,130
Int. Cl.[2] G01J *1/00*; G01T *1/22*
U.S. Cl. 250—338 **16 Claims**



1. A thin-film infrared detector hardened against damage from laser irradiation comprising:

a thin film of material sensitive to infrared radiation;

a thin substrate upon the front-surface of which said thin film is deposited, said substrate having a high thermal conductivity to provide efficient heat flow from said thin film through said substrate, said substrate having a surface area that is large relative to the absorbing area of said thin film so that heat generated by irradiation will be distributed transversely within said substrate;

a heat sink; and

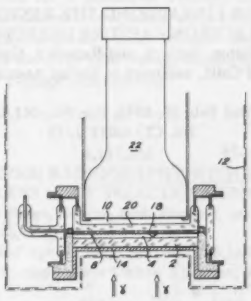
an interface of negligible thermal impedance between said substrate and said heat sink for removing heat from said substrate.

4,117,330

GAMMA RADIATION DETECTOR

Alain Lansiart, Gif-sur-Yvette; Jean-Pierre Morucci, Pins-Justaret, and Alain Seigneur, Choisel, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Apr. 21, 1977, Ser. No. 789,627
Claims priority, application France, Apr. 27, 1976, 76 12427
Int. Cl.[2] G01T *1/20*
U.S. Cl. 250—361 R **5 Claims**



1. A gamma radiation detector, wherein it comprises a xenon crystal, a xenon atmosphere above said xenon crystal, a pair of electrodes comprising two metallic electrodes on either side of the xenon crystal, the first electrode being brought to negative potential (cathode) and located in the vicinity of one face of the xenon crystal and the second electrode brought to positive potential (anode) is placed parallel to the cathode in the xenon atmosphere and means for visualising photons emitted in the

gaseous xenon atmosphere, whereby the face of the xenon crystal in the vicinity of the cathode is arranged in such a way that it receives the gamma radiation to be measured.

4,117,331

IMAGE TRANSLATION DEVICES

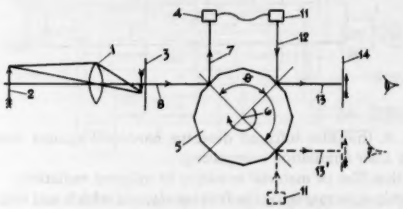
William George Moore Wilson, Blackwater, and Douglas Edward Stewart, Frimley Green, both of England, assignors to The Marconi Company Limited, Chelmsford, England

Filed May 2, 1977, Ser. No. 792,742

Claims priority, application United Kingdom, May 5, 1976, 18414/76

Int. Cl.[2] H01J *31/49*

U.S. Cl. 250—334 **12 Claims**



1. An image translation device comprising an object field, a rotatable substantially regular polygon having peripheral facets differently angled with respect to the axis of rotation of said polygon for scanning said object field in strips, an opto-electrical transducer for receiving optical signals reflected by said facets and converting them into electrical signals, an image field, a rotatable substantially regular polygon having peripheral facets differently angled with respect to its axis of rotation for scanning said image field in strips, an electro-optical trancsducer for receiving said electrical signals and coverting them into optical signals for reflection to said image field, the two transducers being coupled together electrically for the transmission of optical signals from said object field to said image field, and said facets being angled in such manner that the two facets respectively scanning the object field and the image field at any instant have complementary angles for effecting image inversion between the object field and the image field.

4,117,332

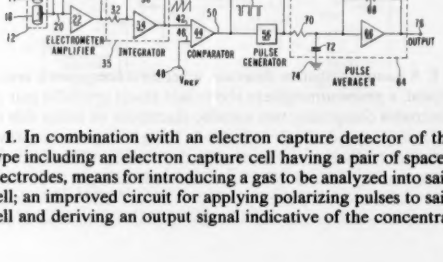
CIRCUIT FOR LINEARIZING THE RESPONSE OF AN ELECTRON CAPTURE DETECTOR

John Robert Felton, Antioch, and Russell S. Gutow, Jr., Foster City, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed Feb. 26, 1976, Ser. No. 661,467

Int. Cl.[2] G01T *1/18*

U.S. Cl. 250—374 **8 Claims**



1. In combination with an electron capture detector of the type including an electron capture cell having a pair of spaced electrodes, means for introducing a gas to be analyzed into said cell; an improved circuit for applying polarizing pulses to said cell and deriving an output signal indicative of the concentration of an electron capturing component of said gas, said circuit comprising:

an electrometer-amplifier;

a source for providing a reference current;

means for combining said reference current with the current output from said cell generated in response to said polarizing pulses, and for providing the combined current to said electrometer-amplifier to thereby provide an output signal from said electrometer-amplifier indicative of the difference between said reference and cell currents;

an integrator connected to receive the output signal from said electrometer-amplifier, said integrator producing a linear change of voltage with time output signal, the rate of voltage change with time being proportional to the magnitude of said electrometer-amplifier output signal;

a comparator connected to compare the output signal from said integrator with a fixed reference voltage for generating a triggering pulse output signal when said integrator output signal equals said fixed reference voltage;

means connected to receive said comparator output signal for resetting said integrator upon the occurrence of a triggering pulse at said comparator;

pulse generator means coupled to said comparator for generating pulses in response to triggering pulses from said comparator;

means connecting said pulses from said pulse generator means in feedback relationship to said cell to provide a pulsed polarizing potential across said electrodes in accordance with the frequency of the pulses produced by said pulse generator means; and

pulse averager means connected to the output of said pulse generator means for producing an output voltage signal proportional to said pulse frequency.

4,117,333

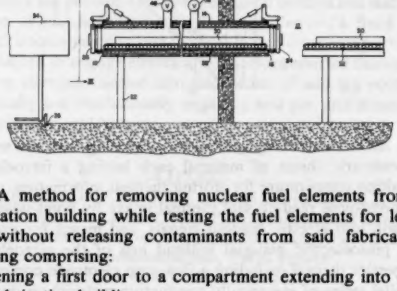
NUCLEAR FUEL ELEMENT LEAK DETECTION SYSTEM

Clarence D. John, Jr., Penn Hills, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 29, 1977, Ser. No. 792,288

Int. Cl.[2] G01T *1/185*; G01M *3/04*; G01T *3/00*

U.S. Cl. 250—380 **10 Claims**



1. A method for removing nuclear fuel elements from a fabrication building while testing the fuel elements for leaks and without releasing contaminants from said fabrication building comprising:

opening a first door to a compartment extending into said fabrication building;

completely loading said fuel element through the opening of said first door and into said compartment;

closing and sealing said first door thereby completely sealing said fuel element in said compartment;

evacuating said compartment;

activating a particle detecting mechanism connected to said first compartment for detecting the presence therein of particles that have emanated from said fuel element;

opening a second door to said compartment if said particle detecting mechanism does not detect gas and removing said fuel element through the opening of said second door

and from said compartment without releasing contaminants from said fabrication building; and

opening said first door to said compartment if said particle detecting mechanism does detect gas and removing said fuel elements through said opening of said first door and from said compartment without releasing contaminants from said fabrication building.

4,117,334

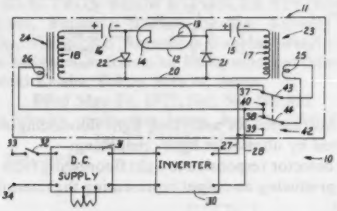
PORTABLE X-RAY UNIT WITH SELF-CONTAINED VOLTAGE SUPPLY

Eric J. Strauts, Park Ridge, Ill., assignor to Magnaflux Corporation, Chicago, Ill.

Filed Apr. 11, 1977, Ser. No. 786,373

Int. Cl.[2] G03B *41/16*

U.S. Cl. 250—402 **3 Claims**



1. In X-ray apparatus, a portable unit including an X-ray tube having a cathode and an anode, means for supplying alternating current to said unit at a relatively low voltage level and high voltage transformer means having primary and secondary winding means in said unit for transforming said alternating current to a high voltage applied between said cathode and said anode of said X-ray tube, said unit comprising: capacitor means, diode means, first connection means for applying said AC current to said primary winding means, and second connection means interconnecting said secondary winding, capacitor and diode means and said anode and cathode of said X-ray tube for operation in a first mode in which said capacitance means are charged to a high potential during each cycle of said alternating current and in which a substantially constant corresponding potential is maintained between said anode and said cathode of said X-ray tube, said diode means comprising first and second diodes each having a cathode and an anode, said capacitance means comprising first and second capacitors each having first and second terminals, and said second connection means including a first connection between said anode of said X-ray tube and said cathode of said first diode and said first terminal of said first capacitor, a second connection between said cathode of said X-ray tube and said anode of said second diode and said first terminal of said second capacitor and a third connection between said anode of said first diode and said cathode of said second diode with said secondary winding means being connected to said third connection and to said second terminals of said first and second capacitors, the AC voltages measured with reference to said third connection being in the same phase at said second terminals of said first and second capacitors in said first mode of operation in which a substantially constant potential is maintained between said anode and said cathode of said X-ray tube said portable unit further comprising phase switching means associated with at least one of said connection means for selective operation in a second mode in which the charge voltage developed across said capacitance means is added to the alternating voltage developed across said secondary winding means to produce a pulsating voltage applied between said anode and said cathode of said x-ray tube.

4,117,335

X-RAY DIAGNOSTIC GENERATOR FOR THE PURPOSE OF FLUOROSCOPY AND PHOTOGRAPHY

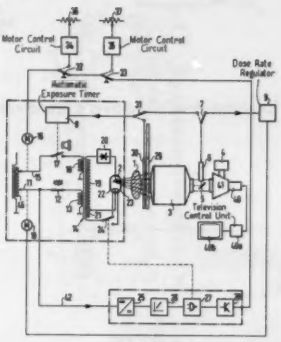
Kurt Franke, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 11, 1977, Ser. No. 823,714

Claims priority, application Fed. Rep. of Germany, Jan. 14, 1977, 2701433

Int. Cl.[2] G03B *41/16*

U.S. Cl. 250—402 **1 Claim**



1. X-ray diagnostic generator for the purpose of fluoroscopy and photography comprising an image intensifier, an installation for regulating the dose rate during fluoroscopy, adjustment means for determining the photographic exposure x-ray tube voltage, an automatic exposure timer and a function generator to which a signal is supplied corresponding to the respective fluoroscopy x-ray tube voltage, which forms from the signal an output signal for controlling the adjustment means for the photographic exposure-x-ray tube voltage, and in which the characteristic of the photographic exposure voltage is programmed as a function of the fluoroscopy voltage, characterized in that hand switches (**32, 33**) are provided by means of which the adjustment means (**16**) for the photographic exposure-x-ray tube voltage can be selectively connected to a nominal value selector (**36**) for a fixedly predetermined photographic exposure-x-ray tube voltage which is high in comparison with the photographic exposure-x-ray tube voltage automatically adjusted for a patient of average constitution, or which can be connected to a nominal value selector (**37**) for a photographic exposure-x-ray tube voltage which is low in comparison with the x-ray tube voltage automatically adjusted for a patient of average constitution.

4,117,336

COMPUTERIZED RADIOGRAPHY WITH MEANS TO PROCESS ONLY SELECTED SIGNALS

Stephen Ronald Bates, Bourne End, England, assignor to EMI Limited, Hayes, England

Filed Apr. 6, 1977, Ser. No. 785,186

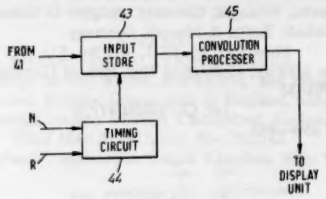
Claims priority, application United Kingdom, Apr. 15, 1976, 15515/76

Int. Cl.[2] A61B *6/02*

U.S. Cl. 250—445 T **9 Claims**

1. Radiographic apparatus including means for proejcting radiation through a body along a plurality of coplanar sets of paths, each set including paths distributed across a substantial region of said body in said plane, and the paths of each set being orientated at a respective angle, or mean angle, in the plane, detector means for detecting the radiation emergent from the body along each path and processing means for processing output signals derived from said detector means and indicative of the absorption suffered by the radiation on tra-

versing the paths of some only of said sets to evaluate the absorption coefficient, with respect to said radiation, at each of



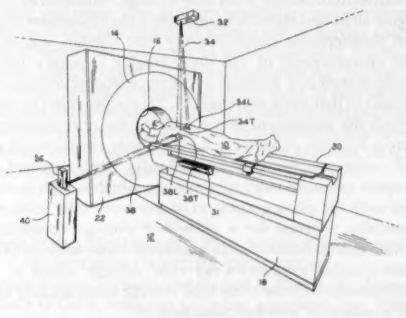
a plurality of locations distributed over a predetermined region in the plane.

4,117,337

PATIENT POSITIONING INDICATION ARRANGEMENT FOR A COMPUTED TOMOGRAPHY SYSTEM

Peter Francis Staats, Waukesha, Wis., assignor to General Electric Company, Milwaukee, Wis.

Filed Nov. 3, 1977, Ser. No. 848,275
Int. Cl.[2] G03B *41/16*
U.S. Cl. 250—445 T **11 Claims**



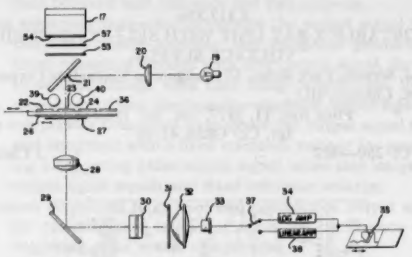
1. An arrangement for indicating the staged position of a patient in relation to a first scan of a computed tomography system and for examining the patient with penetrating radiation such as x-rays, the arrangement including a source of an x-ray beam and a detector disposed about a generally vertical gantry having a generally cylindrical opening for receiving the patient, said system including a generally horizontal patient supporting table which is translatable along the longitudinal axis generally centered within the opening of the gantry wherein the table is displacable from an initial staged position outside of the gantry to a predetermined position within the gantry for the first scan of the patient and the table is further displaceable for the purpose of disposing additional layers of the patient into the path of the x-ray beam, said arrangement comprising a first energy beam source located so as to project a first visible pattern on the surface of the patient prior to the patient being translated into said gantry and said first pattern corresponding to the location of the first scan of said system when the patient-supporting table is subsequently translated into said gantry.

4,117,338

AUTOMATIC RECORDING FLUOROMETER/DENSITOMETER

Robert F. Adrion, Big Flats, N.Y.; Robert T. Buck, Raleigh, N.C., and William R. Eppes, Painted Post, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed May 24, 1977, Ser. No. 800,004
Int. Cl.[2] G01N *21/38*
U.S. Cl. 250—461 R **22 Claims**



1. An instrument for analyzing light fluorescing from samples excited by ultraviolet light comprising:

a light detector responsive to light fluorescing from a sample and producing an output representing the intensity of said light,

a recording device, the output of said detector being connected to said recording device for recording the intensity of light fluorescing from said sample,

an integral viewer having a hood shielding a sample from ambient light and an opening for observation of light fluorescing from said sample, and

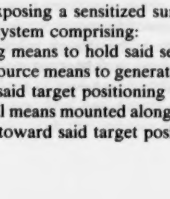
an ultraviolet light source positioned so that ultraviolet light from the same source can excite a sample which fluoresces light incident upon said light detector and can excite a sample which fluoresces light observed through said viewer.

4,117,339

DOUBLE DEFLECTION ELECTRON BEAM GENERATOR FOR EMPLOYMENT IN THE FABRICATION OF SEMICONDUCTOR AND OTHER DEVICES

John Edmond Wolfe, Escondido, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Jul. 1, 1977, Ser. No. 812,421
Int. Cl.[2] H01J *37/14*; 313 *336;442;361;426*
U.S. Cl. 250—492 A **11 Claims**



1. A system for exposing a sensitized surface to a variable electron beam, said system comprising:

a target positioning means to hold said sensitized surface;

an electron beam source means to generate an electron beam along a path to said target positioning means;

an electric potential means mounted along said path to accelerate said beam toward said target positioning means;

a magnetic focusing means mounted along said path to provide a magnetic focusing field between said electron beam source means and said target positioning means such that the image focal distance is, quantitatively longer than the related object focal distance, said focusing means including electromagnetic means to provide sufficient magnetomotive force to focus said beam on a sensitized surface at said target positioning means;

first deflection means mounted along said path between said magnetic focusing means and said target positioning means to deflect said electron beam from said path; and

second deflection means mounted along said path between said first deflection means and said target positioning means to deflect said electron beam in a direction opposite from that of said first deflection means such that said redeflected electron beam is parallel to said path.

4,117,340

ELECTRON BEAM EXPOSURE SYSTEM

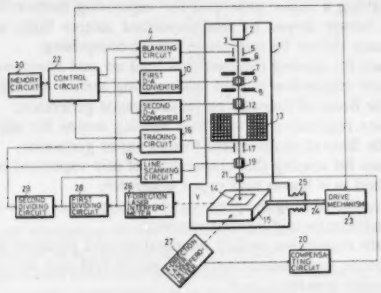
Eiichi Goto, Fujisawa; Takashi Souma, Kiyose; Masanori Idesawa, Wako, and Kazumitsu Tanaka, Akishima, all of Japan, assignors to Rikagaku Kenkyusho and Nihon Denshi Kabushiki Kaisha, Tokyo, both of, Japan

Filed May 31, 1977, Ser. No. 801,812

Claims priority, application Japan, Jun. 11, 1976, 51-69103

Int. Cl.[2] H01J *37/20*

U.S. Cl. 250—492 A **9 Claims**



1. An electron beam exposure system comprising a source for emitting an electron beam; means comprising two aperture plates having multi-sided openings and an electron beam lens and a first deflecting means located between said two aperture plates, said electron beam lens serving to focus the image of the first aperture plate on the second aperture plate, said first deflecting means serving to vary the shape and size of said electron beam cross-section through the combined interceptive action of said two aperture plates; an electron optical system for converging and projecting the electron beam thus shaped onto a workpiece; a driving means for shifting the workpiece continuously in a selected direction; and a second deflecting means for deflecting the electron beam in a narrow band range on the workpiece more or less perpendicular to said selected direction.

4,117,341

CONTROL MEANS

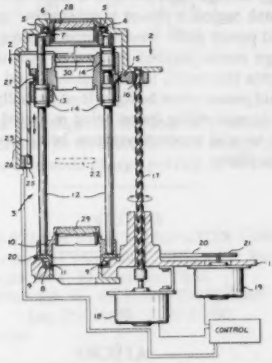
Staffan B. Persson, Kenmore, N.Y., assignor to American Optical Corporation, Southbridge, Mass.

Filed Aug. 2, 1976, Ser. No. 710,774

Int. Cl.[2] G01N *21/30;* **A61B** *3/00, 3/10*

U.S. Cl. 250—561 **4 Claims**

1. In an apparatus having a member moveable in first and second directions along a first path, a reference position along said first path, drive means to move said member along said first path in either of said first and second directions and selectively activatable control means operably connected to said drive means for returning said member to said reference position, the improvement comprising, an occluder connected to said member and moveable along a second path in response to movement of said member, one end of said occluder being positioned at a location along said second path when said member is at said reference position, an energy beam interesecting said second path at said location, detecting means for detecting said energy beam and including signal generating means, said occluder interrupting said energy beam when said



member is spaced from said reference position in said first direction, said control means, when activated, stopping said drive means in response to a change in the signal from said generating means and said control means, when activated, driving said member in said first direction when said signal indicates the presence of said energy beam and driving said member in said second direction when said signal indicates the absence of said energy beam.

4,117,342

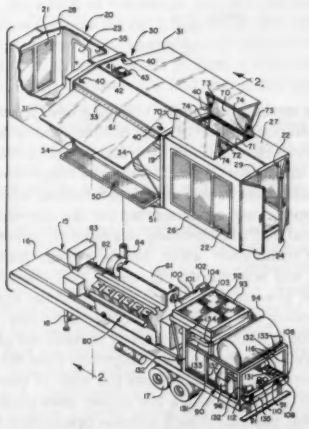
UTILITY FRAME FOR MOBILE ELECTRIC POWER GENERATING SYSTEMS

Joseph F. Melley, Jr., Davie, Fla., assignor to Melley Energy Systems, Fort Lauderdale, Fla.

Filed Jan. 13, 1977, Ser. No. 759,212

Int. Cl.[2] H02P *9/04*

U.S. Cl. 290—1 A **7 Claims**



1. An improvement for use in a mobile electric power generating system including a substantially enclosed trailer having a

substantially flat bed and a power plant secured to said bed, comprising:

a utility frame, movable independently of said power plant, adapted to be mounted on said bed; said utility frame having means defining a fuel storage tank region, a start-up energy storage tank region, a radiator region, and a power plant support apparatus region; and

support systems for said power plant including a fuel storage tank secured at said fuel storage tank region, a start-up energy storage tank secured at said start-up energy storage tank region, a power plant support apparatus secured at said power plant support apparatus region, and coolant storage means secured relative to said utility frame and movable therewith; at least some of said support systems for said power plant being at least partially interconnected prior to said utility frame being mounted on said bed and prior to said support systems being connected to said power plant.

4,117,343
TURBO-MACHINE PLANT HAVING OPTIONAL OPERATING MODES

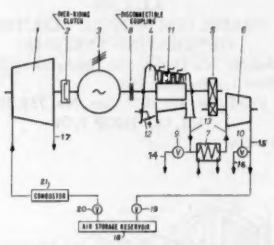
Hans Hoffeins, Viernheim, Fed. Rep. of Germany, assignor to Brown Boveri-Sulzer Turbomaschinen AG., Zurich, Switzerland

Continuation of Ser. No. 515,058, Oct. 15, 1974, abandoned. This application Dec. 15, 1976, Ser. No. 750,702

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1973, 2355789

Int. Cl.[2] F02C *9/04*

U.S. Cl. 290—52 **7 Claims**



1. In the method for rapidly changing over from a first to a second operational mode of a gas turbine plant which includes a synchronous electrical machine that can be operated optionally either as a motor or generator, and a compressor and a gas turbine connectible to said electrical machine, wherein during said first operational mode serving for the compression of air the electrical machine operating as a motor is connected to and drives the compressor while the gas turbine remains out of operation, and wherein during said second operational mode serving for generation of electrical power the electrical machine operating as a generator is connected to and is driven by the gas turbine while the compressor remains out of operation, the improvement wherein the changeover from the first to the second operational mode includes the steps of converting the compressor to operation at a low power absorption level from the electrical machine which remains operational as a motor, and then connecting the gas turbine to the electrical machine when the turbine reaches synchronous speed.

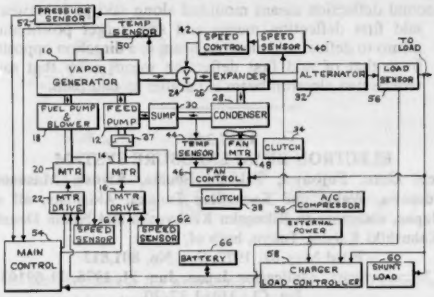
4,117,344
CONTROL SYSTEM FOR A RANKINE CYCLE POWER UNIT

Leslie H. Boerstler, Valley Forge; Walter V. Discenza, Jr., Lionville, both of Pa.; Mason D. Marvin, Cincinnati, Ohio, and Theodore J. Ebersole, King of Prussia, Pa., assignors to General Electric Company, Fairfield, Conn.

Filed Jan. 2, 1976, Ser. No. 646,275

Int. Cl.[2] F01D *15/10*; H02P *9/04*

U.S. Cl. 290—52 **4 Claims**



1. A control system for an external combustion power system having a vapor generator for vaporizing motive fluid, a prime mover driven by said vaporized motive fluid, and an alternator driven by said prime mover comprising:

means for sensing the electrical load on said alternator;

means responsive to said load sensing means for adjusting the flows of fuel and air to said vapor generator;

means responsive to said load sensing means for adjusting the flow of motive fluid to said vapor generator;

means for sensing the temperature of said vaporized motive fluid as it leaves said vapor generator;

means for sensing the pressure of said vaporized motive fluid as it leaves said vapor generator;

means responsive to said temperature and pressure sensing means for moderating the flow of fuel and air to said vapor generator; and

means responsive to said pressure sensing means for moderating the flow of motive fluid to said vapor generator.

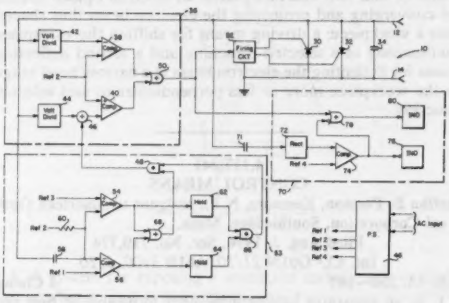
4,117,345
MARINE GROUND ISOLATOR

Orville Balcom, 24521 Walnut St., Lomita, Calif. 90717

Filed Aug. 22, 1977, Ser. No. 826,851

Int. Cl.[2] H01B *7/28*

U.S. Cl. 307—95 **10 Claims**



1. A ground device adapted for use in a ground connection so as to selectively allow the flow of current therethrough, said device comprising:

switch means connected in series between two portions of

said ground connection for providing a low impedance connection therebetween only in response to an applied control signal; and

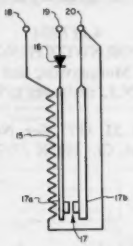
means for monitoring the potential between said portions of the ground connection and for applying a control signal to said switch means only when the dc potential between said portions of the ground connection is outside of a preselected voltage range or when the ac potential therebetween exceeds a preselected value.

4,117,346

THERMAL POWER SUSTAINING SWITCH

Eldon W. Burgess, 3343 Marinda Way, Salt Lake City, Utah 84121

Filed Dec. 2, 1976, Ser. No. 746,849
Int. Cl.[2] H01H *7/06, 37/52, 61/02*
U.S. Cl. 307—117 **8 Claims**



1. A thermal power sustaining switch having a divided circuit consisting of two branches connectable to an existing switch as an appendage thereto comprising:

(a) A first branch of the divided circuit containing a heating element connectable in series between the existing switch and an electrical device and adapted to heat the thermal power sustaining switch and provide a flow of electricity through said first branch when the existing switch is in a closed position, and

(b) a second branch of the divided circuit connectable in parallel with the first branch and the existing switch between the power input line to the existing switch and an electrical device, said second branch containing, in series an isolating device consisting of one or more diodes and a thermal switch such that when the thermal switch is closed electricity will flow through said second branch.

4,117,347

CHARGED SPLITTING METHOD USING CHARGE TRANSFER DEVICE

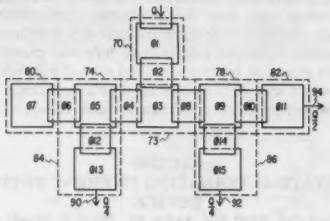
Thomas Hornak, Los Altos, and Richard C. Lucas, Portola Valley, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 678,277, Apr. 19, 1976, abandoned.
This application Sep. 15, 1977, Ser. No. 833,772
Int. Cl.[2] G11C *19/28;* **H01L** *29/78*
U.S. Cl. 307—221 D **12 Claims**

2. A method for splitting charge comprising the steps of:

splitting a quantity of charge Q into a first plurality of first charge portions;

splitting the first plurality of first charge portions into a second plurality of second charge portions;



combining a plurality of the second plurality of second charge portions to form a combined charge portion; and

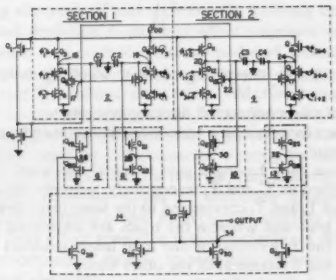
applying the combined charge portion as an output.

4,117,348

MULTI-PHASE CLOCK MONITOR CIRCUIT

Francis L. Newman, El Toro, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jul. 11, 1977, Ser. No. 814,246
Int. Cl.[2] H03K *5/18, 19/00*
U.S. Cl. 307—232 **18 Claims**



1. A circuit to test the reliability of the clocks comprising a multi-phase clock system to repeatedly switch between first and second recurring clock signal levels, said circuit including:

source means to provide a plurality of reference potentials,

first charge storage capacitance means,

means by which to precharge said first charge storage capacitance means during a first phase time interval,

first and second multi-terminal semiconductor devices connected in electrical series to form a first conditional discharge path between said first charge storage capacitance means and said source means,

the control terminal of said first multi-terminal device connected to a first of said multi-phase clocks to be tested,

the control terminal of said second multi-terminal device connected to a second of said multi-phase clocks to be tested,

a third multi-terminal semiconductor device connected between said first charge storage capacitance means and said source means to form a second conditional discharge path,

said first charge storage capacitance means remaining charged during a second phase time interval when each of said first and second clocks to be tested switches between the first and second signal levels or said first charge storage capacitance means discharged via one of said first or second conditional discharge paths during the second phase time interval when one of said first and second clocks to be tested fails to switch between the first and second signal levels,

output terminal means responsive to the charge of said first charge storage capacitance means, and

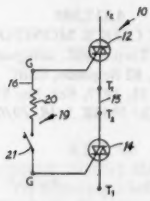
means to selectively connect said output terminal means to said source means to receive a first of said reference potentials when said first charge storage capacitance means remains charged to thereby indicate clock reliability or to selectively connect said output terminal means to said source means to receive a second of said reference potentials when said first charge storage capacitance means is discharged to thereby indicate a clock failure.

4,117,349

SOLID STATE ALTERNATING CURRENT SWITCHING DEVICE

Eduard Karl Ott, 7427 NE. 144th Pl., Bothell, Wash. 98011

Division of Ser. No. 523,226, Nov. 13, 1974, Pat. No. 4,006,367.
This application Oct. 20, 1976, Ser. No. 734,196
Int. Cl.[2] H03K *17/72*
U.S. Cl. 307—252 B **7 Claims**



1. A solid state alternating current switching device, comprising:

a pair of triacs connected directly in series;

said triacs each having a nonconductive state and a conducting state;

said triacs each having a gate terminal and main terminals identified as T_1 and T_2 respectively, wherein the designation of T_1 and T_2 correspond to the same main terminals in each triac and wherein the triacs are connected in series with the T_1 terminal of one triac interconnected directly with the T_2 terminal of the other triac;

an isolated circuit directly interconnecting the gate terminals; and

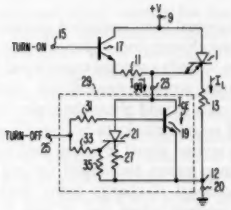
said circuit having means for selectively permitting an internal gate current to be conducted through the circuit between the gate terminals to change the triacs from their nonconducting states.

4,117,350

SWITCHING CIRCUIT

Martin Aaron Kalfus, Morganville, and Hans Werner Becke, Morristown, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 31, 1977, Ser. No. 783,219
Int. Cl.[2] H03K *17/72*
U.S. Cl. 307—252 C **10 Claims**



1. A circuit for turning-off a gate-turn-off controlled rectifier having a gate electrode, and having a main current path connected between a first terminal for receiving an operating voltage and a second terminal for receiving a reference voltage, comprising:

a third terminal for receiving a turn-off signal;

thyristor means having a main current path connected between said gate electrode and said second terminal and having a control electrode connected to said third terminal for conducting a major portion of the initial peak gate current that attends the turn-off of the gate-turn-off controlled rectifier through its main current path in response to said turn-off signal; and

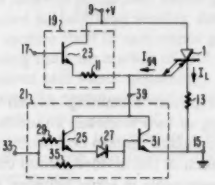
transistor means having a main current path connected between said gate electrode and said second terminal, and having a control electrode connected to said third terminal for conducting a predetermined limited portion of said gate current through its main current path in response to said turn-off signal, to reduce the voltage drop between said gate electrode and said second terminal when said gate current is insufficient to supply this predetermined limited magnitude and thereby completing the turn-off of said gate-turn-off rectifier.

4,117,351

TRANSISTOR SWITCHING CIRCUIT

Martin Aaron Kalfus, Morganville, and Dale Milton Baugher, Flemington, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 31, 1977, Ser. No. 783,221
Int. Cl.[2] H03K *17/72*
U.S. Cl. 307—252 C **12 Claims**



1. A circuit for turning-off a gate-turn-off controlled rectifier having a gate electrode, and having a main current path connected between a first terminal for receiving an operating voltage and a second terminal for receiving a reference voltage, comprising:

a third terminal for receiving turn-off signals;

first transistor means having a main current path connected between said gate electrode and said second terminal, and having a control electrode;

second transistor means having a main current path connected between said gate electrode and said control electrode of said first transistor means, and having a control electrode;

first biasing means for supplying current from said third terminal to the control electrode of said second transistor means in response to each one of said turn-off signals, said second transistor means responding to the current supplied to its control electrode by lowering the relative impedance of its main current path to conduct current to the control electrode of said first transistor means, said first transistor means responding to the current supplied to its control electrode by lowering the impedance of its main current path to conduct a predetermined limited magnitude of current from said main current path of the gate-turn-off controlled rectifier through said gate electrode thereof; and

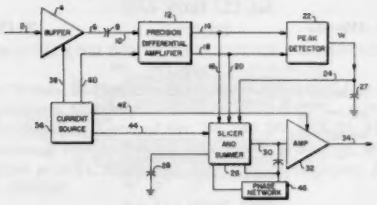
second biasing means for supplying current from said third terminal to the control electrode of said first transistor means in response to each one of said turn-off signals, said

first transistor means responding to current from said third terminal to maintain conduction through its main current path when the voltage drop across its main current path is insufficient to maintain said second transistor means in conduction, said first transistor means thereby acting to further reduce the voltage drop between said gate electrode and the second terminal and completing the turn-off of said gate-turn-off rectifier.

4,117,352
INTEGRATED CLOCK DRIVE CIRCUIT

Jay A. Thomas, and Victor J. Stalick, Jr., both of Sunnyvale, Calif., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Jun. 9, 1977, Ser. No. 805,204
Int. Cl.[2] H03K *1/17*
U.S. Cl. 307—269 **10 Claims**



1. In combination, integrated circuit means and discrete circuit means arranged for generating a clock drive signal from a pseudo-ternary signal, which comprises:

buffering means having an output, and having an input connected to receive a digital signal;

coupling means having an output, and having an input connected to the output of said buffering means;

precision gain means having an input connected to the output of said coupling means and having a first output which provides amplified positive excursions and a second output which provides amplified inverted negative excursions of the pseudo-ternary signal;

peak detection means having first and second inputs connected, respectively, to the first and second outputs of said precision gain means, and having an output;

means for storing the peak amplitude output from said detection means, said storing means having an input connected to the output of said peak detection means and having an output;

means for establishing a slicing level amplitude in relation to said peak amplitude, said establishing means having an input connected to the output of said storing means and having an output;

means for slicing the digital signal having first and second inputs, respectively, connected to the first and second outputs of said precision gain means, having a third input connected to the output of said establishing means, and having an output;

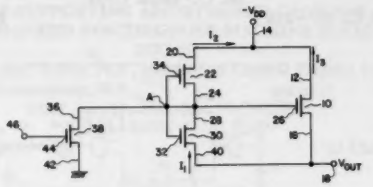
means for adjusting the phase of the sliced signal, having an input connected to the output of said slicing means, and having an output; and

means for increasing the output amplitude of said sliced signal having an input connected to the output of said adjusting means and having an output.

4,117,353
CONTROLLED CURRENT SINK

Walter J. Butler, Scotia, and Charles W. Eichelberger, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 23, 1976, Ser. No. 753,772
Int. Cl.[2] H02J *1/04;* **H03K** *1/12;* **G05F** *1/56*
U.S. Cl. 307—297 **6 Claims**



1. A controlled current sink comprising:

a main current carrying depletion mode field effect transistor having first and second current carrying electrodes and a control electrode for regulating the amount of current flowing through said current carrying electrodes of said main current carrying transistor;

a first enhancement mode field effect transistor connected between said control electrode and said first current carrying electrode of said main current carrying transistor;

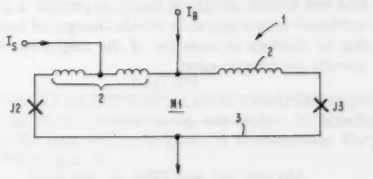
a second depletion mode field effect transistor connected between said control electrode and said second current carrying electrode of said main current carrying transistor; said first enhancement mode field effect transistor and said second depletion mode field effect transistor each including a gate terminal, said gate terminals connected directly together and connected directly to said control electrode of said main current carrying transistor; and

field effect transistor means for selectively grounding said control electrode of said main current carrying transistor, said field effect transistor means including a drain electrode connected directly to said gate terminals and said control electrode.

4,117,354
TWO-PART CURRENT INJECTION INTERFEROMETER AMPLIFIERS AND LOGIC CIRCUITS

Tushar Ramesh Geewala, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1977, Ser. No. 811,733
Int. Cl.[2] H03K *19/195*
U.S. Cl. 307—306 **34 Claims**



1. A Josephson tunneling circuit comprising:

an interferometer capable of exhibiting a nonlinear switching characteristic and having at least a pair of junctions capable of carrying Josephson current and at least an inductance interconnecting said junctions, and,

means directly connected to said interferometer for producing said nonlinear switching characteristic.

4,117,355
TEMPERATURE INDEPENDENT TRIGGER PULSE ANALYSIS CIRCUIT

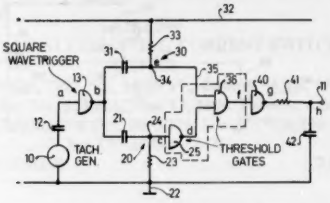
Helmut Fleischer, Schwieberdingen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Mar. 11, 1977, Ser. No. 776,742

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1976, 2610841

Int. Cl.[2] H03K *17/14*

U.S. Cl. 307—310 **13 Claims**



1. Temperature independent trigger signal analysis circuit in which trigger signals are converted into an output signal having a characteristic representative of the trigger signals and their respective rate or frequency comprising

means (**13**; **50**, **52**) generating a train of square-wave pulse representative of said signals;

a first monostable trigger stage (**20**) including means (**13**) connected to have said pulses applied thereto and sensing a dropping flank (F_1) of the pulse to set the trigger stage and provide a decaying pulse;

a first threshold sensing stage (**25**) having a predetermined threshold level, connected to have said decaying pulse applied thereto and providing a first output signal having a time duration representative of the time between occurrence of said dropping flank of the pulses and when the threshold level of the stage is passed by the decaying signal;

a second trigger stage (**30**) including means sensing a rising flank (F_2) of the pulse representative of said signal to set the second trigger stage, said second trigger stage being connected in parallel to the first trigger stage (**20**) and providing an increasing pulse;

a second threshold stage (**36**, **53**) having a second predetermined threshold level connected to have said increasing pulse applied thereto and providing a second output signal having a time duration representative of the time of occurrence of said rising flank of the pulses and when the threshold level of the second stage is passed by the increasing signal;

and logic circuit means (**36**, **40**, **41**, **42**; **54**, **55**) combining said first output signal and said second output signal from the first and second threshold stages to provide a composite combined output signal in which changes of temperature due to changes in response of the respective threshold circuits are compensated.

4,117,356
ROTOR FOR STEPPING MOTOR

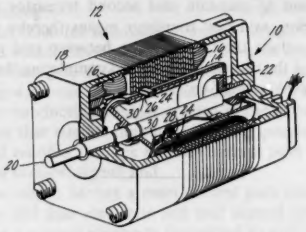
Donald Longworth Mansfield, S. Hamilton, and Walter Ray Woodward, Carlisle, both of Mass., assignors to USM Corporation, Farmington, Conn.

Filed Jan. 14, 1977, Ser. No. 759,257

Int. Cl.[2] H02K *37/00*

U.S. Cl. 310—49 R **5 Claims**

1. A stepping motor of the harmonic drive type comprising a substantially cylindrical rotor having a stiffness characterized by a radially deflectable wall the thickness of which has been



selected in a ratio to the non-deflected rotor diameter in the range of from about 0.50% to about 2.0%.

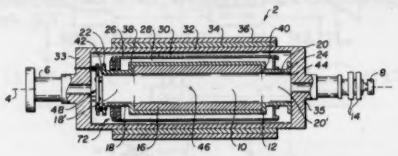
4,117,357
FLEXIBLE COUPLING FOR ROTOR ELEMENTS OF A SUPERCONDUCTING GENERATOR

Kai J. Baumann, Pittsburgh, Pa., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Apr. 15, 1977, Ser. No. 787,805

Int. Cl.[2] H02K *9/00*

U.S. Cl. 310—52 **20 Claims**



1. A superconducting rotor comprising:

a plurality of elongate concentric rotor elements;

means for cooling the innermost rotor element; and

means for connecting the rotor elements including means forming the sole support between at least one pair of the rotor elements at at least one end of the superconducting rotor including a ring, first means annularly spaced about the ring for securing the ring to one rotor element of the one pair, and second means spaced between the first means for securing the ring to the other rotor element of the one pair, the ring having an axial thickness sufficiently large with respect to the radial width thereof so that the ring forms a radially and torsionally rigid connection while permitting its out of plane deflection, whereby during operation of the superconducting rotor relative axial movements of the rotor elements of the one pair due to thermal contractions and expansions thereof are accommodated by the ring and the concentricity of the rotor elements of the one pair is maintained.

4,117,358
COMBINED ELECTRICAL AND COOLANT DISTRIBUTION SYSTEM FOR DYNAMOELECTRIC MACHINES HAVING INTERNALLY COOLED STATOR WINDINGS

Carl Flick, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 6, 1976, Ser. No. 748,245

Int. Cl.[2] H02K *9/08*

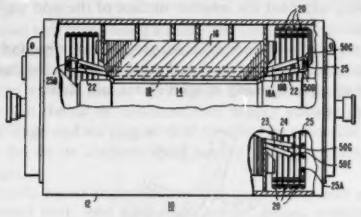
U.S. Cl. 310—59 **7 Claims**

1. A dynamoelectric machine comprising:

a stator portion having a core member with a plurality of coils constituting stator windings disposed in said core, said windings having terminating portions with end turn portions disposed intermediate thereto at the ends of said

core member, said windings comprising a plurality of electrical conductors and at least one cooling passage capable of passing coolant therethrough; and

a plurality of hollow, electrical conductors, each of which constitutes a phase lead and each of which branches at a



first end into a plurality of conduit members wherein one of said conduit members is electrically and hydraulically connected to one of said windings' terminating portions while the remaining conduit members of each plurality are electrically insulated from and hydraulically connected to at least one of said end turn portions.

4,117,359

BEARING AND DRIVE STRUCTURE FOR SPINNING TURBINE

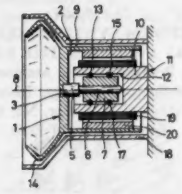
Heinz Wehde, Rothenberg, Germany, assignor to Teldix GmbH, Heidelberg, Germany

Continuation-in-part of Ser. No. 545,292, Jan. 29, 1975, abandoned. This application Jun. 14, 1976, Ser. No. 695,551

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1974, 2404241

Int. Cl.[2] H02K *7/00*

U.S. Cl. 310—67 R **39 Claims**



1. A bearing and drive structure for a funnel-shaped spinning element of an open-end spinning turbine, comprising:

a stator having a bearing supporting part;

a stationary component of a journal bearing including a bearing bush having an opening for receiving a rotary component, and means elastically mounting said bush to said stator bearing supporting part;

a pin element connected to the spinning element and having an end portion constituting the rotary component received in said opening of said bush;

a rotor having a cup-shaped part enclosing said stator part and having a front end to which said spinning element is connected to rotate with said rotor;

electrical windings on said stator cooperating with said rotor to form an electrical drive for rotating said rotor;

said rotor part having an axially compact configuration for causing its largest central principal moment of inertia to be about its axis of rotation;

said journal bearing stationary component being located within the region enclosed by said cup-shaped rotor part; and

said rotor part being formed to locate the center of gravity of said rotor in a plane normal to the axis of rotation of said stator and at least approximately located between the axial ends of said journal bearing stationary component.

4,117,360

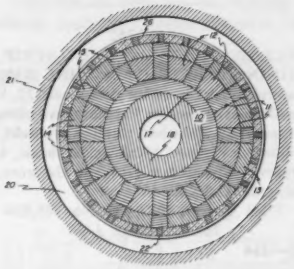
SELF-SUPPORTING AMORTISSEUR CAGE FOR HIGH-SPEED SYNCHRONOUS MACHINE SOLID ROTOR

Eike Richter, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 15, 1977, Ser. No. 787,857

Int. Cl.[2] H02K *21/12, 3/20*

U.S. Cl. 310—183 **12 Claims**



1. In a high-speed solid rotor machine wherein the rotor comprises:

a cylindrical nonmagnetic hub; a plurality of circumferentially-spaced longitudinally-extending pole pieces affixed to the outer surface of said hub; a plurality of permanent magnets disposed between said pole pieces; a shrink ring surrounding and retaining said pole pieces and permanent magnets; said shrink ring maintaining said hub, pole pieces and magnets in a state of compression over the total operating speed range of the machine, the improvement comprising:

a cylindrical amortisseur cage fabricated of electrically conductive sheet, fitting tightly about and radially-outward of said shrink ring, said cage including circular end portions joined by a plurality of spaced ribs disposed about the circumference of said shrink ring; and

means exhibiting high tensile strength wound circumferentially under tension about said cage for retaining said cage in contact with said shrink ring against centrifugal force when said machine is operating.

4,117,361

SOLVENTLESS IMPREGNATING COMPOSITION

James D. B. Smith, Turtle Creek, and Robert N. Kauffman, Monroeville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 10, 1975, Ser. No. 540,184

Int. Cl.[2] H02K *3/30;* **C08G** *59/68*

U.S. Cl. 310—208 **25 Claims**

1. A solventless impregnating composition made by

1. forming a mixture of a liquid diepoxide and about 10 to about 80 phr of the diglycidyl ether of a glycol,

2. adding to said mixture in an amount sufficient to effect its cure a catalyst consisting essentially of a compound having the general formula

where each R group is independently selected from the group consisting of alkyl from C_1 to C_{10}, aliphatic, aryl, alkylaryl, cyclic, and heterocyclic.

13. A conductor wrapped with an insulating tape vacuum-pressure-impregnated with a cured composition according to claim **1**.

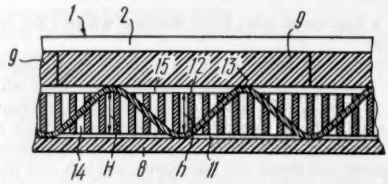
15. A motor having coils comprising a conductor according to claim **13**.

4,117,362

RIPPLE-SHAPED TIGHTENING STRIP FOR RETAINING ELECTRIC MACHINE WINDING

Mark Zakharovich Tsirkin, ulitsa Bela Kuna, 22, korpus 2, kv. 59; Viktor Ovshievich Kogan, Varshavskaya ulitsa, 53, kv. 36; Rudolf Semenovich Polyakov, Liteiny prospekt, 64, kv. 27; Jury Leonidovich Presnov, Moskovskoe shosse, 4, kv. 76, and Elina Sergeevna Khanukova, prospekt Maiorova, 45, kv. 20, all of Leningrad, U.S.S.R.

Filed Apr. 19, 1977, Ser. No. 788,924
Int. Cl.[2] H02K *3/48*
U.S. Cl. 310—214 **7 Claims**



1. An arrangement for retaining windings of an electric machine to restrict movement of the winding bars in radial slots of the core, comprising:

an insulated winding bar disposed in an open slot of the core;

a member retaining said bar extending longitudinally along said slot and spaced from said bar by a clearance;

a ripple-shaped tightening strip disposed in said clearance between said bar and said retaining member and being in a compressed state, said ripple-shaped tightening strip being composed of a rigid insulating, essentially sheet, material and having elastomeric resilient members disposed in the troughs of said rippled-shaped tightening strip.

4,117,363

DC MOTOR

Keisuke Honda, 37, Shinyoshi-cho, Toyohashi-shi, Aichi-ken, Japan

Filed Nov. 11, 1976, Ser. No. 740,812
Claims priority, application Japan, Nov. 29, 1975, 50-157200
Int. Cl.[2] H02K *13/00*
U.S. Cl. 310—219 **2 Claims**

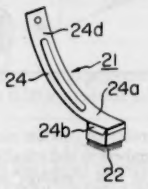
1. A direct current motor, comprising:

a hollow casing having a cylindrical side wall and first and second opposed end walls on opposite ends of said side wall, said casing having aligned holes in said end walls coinciding with the central longitudinal axis of said side wall;

a rotatable shaft disposed along said axis, extending into said casing through said holes, and bearing means secured to each end wall adjacent the corresponding hole for facilitating rotational movement of said shaft with respect thereto;

a rotor assembly comprising a disk disposed within said casing adjacent said first end wall and axially mounted on said shaft for rotation therewith, the periphery of said disk being adjacent the interior surface of the side wall of said casing;

a number of armature coils secured to said disk and extending toward the second end wall of the casing, said coils being equiangularly spaced about said shaft;



a field magnet structure comprising a plurality of permanent magnets secured to said second end wall of said casing and disposed adjacent to and coaxial with said armature coils;

a commutator comprising a plurality of commutator segments mounted on the inner surface of the side wall of said casing and equiangularly spaced apart with respect to said shaft; and

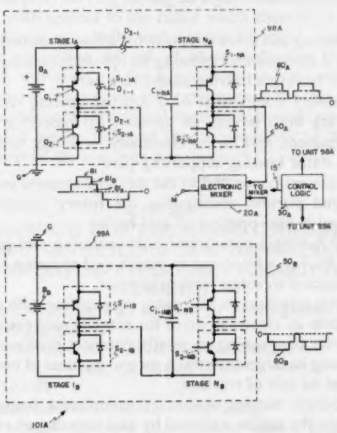
a corresponding plurality of brushes affixed to said rotor assembly adjacent the periphery of said disk and extending to said commutator, each brush having an arcuate resilient arm and an end portion for slidably contacting the segments of said commutator.

4,117,364

VOLTAGE WAVEFORM SYNTHESIZER AND A SYSTEM THAT INCLUDES THE SAME

Richard H. Baker, Bedford, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed May 14, 1976, Ser. No. 686,438
Int. Cl.[2] H02M *7/48*
U.S. Cl. 318—230 **43 Claims**



1. An electronic waveform synthesizer having, in combination:

a first unit comprising a stage that includes dc or unidirectional supply voltage means whose output voltage is at the amplitude E and bilateral stage switch means, the bilateral stage switch means serving to control electric current flow in the dc or unidirectional supply voltage means of the stage and serving as well to effect an electrical bypass of the dc or unidirectional supply voltage means of the stage;

a second unit comprising a stage that includes dc or unidirectional supply voltage means whose output voltage is at the amplitude E and bilateral stage switch means, the bilateral stage switch means serving to control electric current flow in the dc or unidirectional supply voltage means of the stage and serving as well to effect an electrical bypass of the dc or unidirectional supply voltage means of the stage;

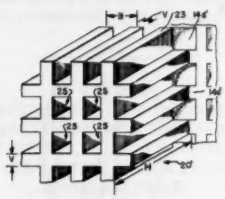
electronic mixer means connected to the first unit and the second unit, said electronic mixer means comprising a plurality of bilateral mixer switches connected to receive the dc or unidirectional electric potential of the dc or unidirectional supply voltage means of the stage of each unit and operable to process the same in a determined and programmable fashion so that there appears at an output port of the electronic waveform synthesizer a waveform that is alternating in nature even though the supply voltage means of each stage and each unit is dc or unidirectional in nature the output of the electronic mixer means being the output that appears at said output port; and

control logic means that serves to activate the bilateral stage switch means of both the first unit and the second unit, as well as the electronic mixer switch means, in a programmable fashion.

4,117,365
CONTINOUS PHOTOCATHODE FOR X-RAY RADIOGRAPHY HAVING TWO-DIMENSIONAL ARRAY OF APERTURES

Kei-Hsiung Yang, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jan. 14, 1977, Ser. No. 759,426
Int. Cl.[2] H01J *39/06, 31/49*
U.S. Cl. 313—101 **7 Claims**



1. Apparatus for X-ray radiography, comprising:

a first conductive planar electrode adapted to transmit a pattern of differentially-absorbed X-radiation, said first electrode having a surface with an array of spaced-apart depressed portions, a raised grid being formed between said depressed portions;

a second conductive planar electrode spaced from, and parallel to, said first electrode;

a sheet of insulative material adjacent a surface of said second electrode facing said first electrode;

a structured photocathode fabricated as a continuous grid of X-ray photoemissive material directly upon the raised grid of said surface of said first electrode facing said second electrode, said photoemissive grid having a two-dimensional array of apertures of substantially constant cross-section formed completely therethrough to said first electrode surface, said apertures being devoid of said photoemissive material and extending substantially parallel to each other and essentially perpendicular to the plane of said first electrode surface;

an avalanche-amplifying gas filling the gap between said insulative sheet and said grid and filling the volume of the apertures of said grid; and

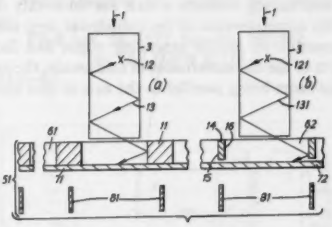
means for forming an electric field between said first and second electrodes;

the photoemissive material of said grid emitting, responsive to said X-radiation, charged particles from the entire surface area thereof, said charged particles interacting with said gas and said field, respectively, for amplification and subsequent collection at said sheet.

4,117,366
RADIATION DETECTORS

Gordon Peter Davis, Sunbury-on-Thames, England, assignor to EMI Limited, Hayes, England

Filed Oct. 30, 1974, Ser. No. 519,218
Claims priority, application United Kingdom, Nov. 3, 1973, 51143/73
Int. Cl.[2] H01J *39/00, 39/02*
U.S. Cl. 313—95 **4 Claims**



1. A multi-channel pick-up tube having a vacuum envelope with a solid entrance window through areas of which radiation can pass unobstructed to a target on the inside of the window for conversion to electrons and having a plurality of electrodes spaced along the tube length separating the inside of the vacuum envelope into a plurality of separate electron multiplication channels to respective anodes, the ends of the channel separating electrodes extending to adjacent the target and defining entrance apertures of the channels for electrons from the target, in which tube the solid window includes side-by-side within its thickness radiation obstruction regions aligned with respective channel separating electrodes which extend at least partly through the solid window and solid radiation-transmitting window areas each associated with a channel of the tube and which regions obstruct the passage of radiation incident on a said area of the window associated with one channel laterally through the window to a part of the target associated with another channel in which said regions are a baffle for visible light in said entrance window and in which the window is formed by a sandwich assembly of alternate layers of materials which transmit and do not transmit light.

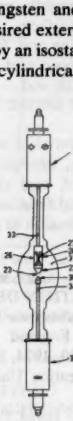
4,117,367
HIGH-PRESSURE DISCHARGE LAMP

Jan Rudolf de Bie; Tjepke Hendrik Ekkelboom; Johannes Jacobus Franciscus Geytenbeek; Willem Lodewijk van Hoorn, and Otmar Schob, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 29, 1975, Ser. No. 600,149
Claims priority, application Netherlands, May 13, 1974, 7406379
Int. Cl.[2] H01J *1/02, 1/14, 1/38;* **H01K** *1/04*
U.S. Cl. 313—352 **1 Claim**

1. A high-pressure discharge lamp which comprises a discharge tube and an anode and a cathode, said anode being made of a refractory material including materials selected from

the group consisting of tungsten and tantalum carbide, said anode being made in the desired external shape from a powder of the desired composition by an isostatic compression process, said anode being generally cylindrical with one end generally



conical and having recesses which are uniformly distributed around the circumference of the cylindrical part, said recesses being bounded by axially extending edges and faces which form parts of the circumferences of said anode, the axes of said edges and faces being parallel to the axis of said anode.

4,117,368

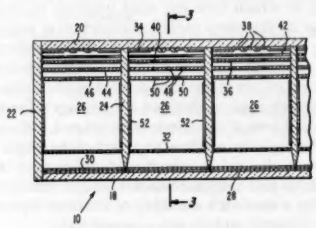
MODULAR TYPE GUIDED BEAM FLAT DISPLAY DEVICE

Frank Jerome Marlowe, Kingston, and Charles Hammond Anderson, Rocky Hill, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Jun. 1, 1976, Ser. No. 691,397

Int. Cl.[2] H01J *29/08, 29/72, 29/50*

U.S. Cl. 313—422 **10 Claims**



10. In an electron display device having an evacuated envelope with a front wall, a plurality of channels extending along the front wall and a phosphor screen along the inner surface of the front wall in each channel, the method of:

generating and directing at least one beam of electrons along each of said channels along a path at least a portion of which extends toward said phosphor screen so that the beam will impinge of the screen.

deflecting the beams in alternate channels transversely across their respective channels in one transverse direction, and

simultaneously deflecting the beams in the other channels transversely across their respective channels in the opposite transverse direction.

4,117,369

HIGH-PRESSURE DISCHARGE LAMP

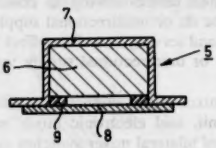
Gijsbert Kuus, and Adriaan Jan de Ridder, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 20, 1977, Ser. No. 834,955

Claims priority, application Netherlands, Oct. 8, 1976, 7611136

Int. Cl.[2] H01J *19/68*

U.S. Cl. 313—178 **1 Claim**



1. A high-pressure discharge lamp having a discharge vessel comprising electrodes between which the discharge takes place during operation, a gas filling and a hydrogen getter in a metal, hydrogen-permeable envelope, characterized in that only that part of the metal envelope of the hydrogen getter which faces the discharge consists of hydrogen-permeable metal.

4,117,370

DISCHARGE LAMP HAVING A GLOW DISCHARGE STARTER WITHIN THE OUTER ENVELOPE

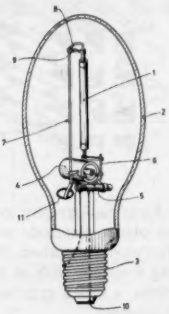
Cornelis Adrianus Joannes Jacobs; Antonius Jozephus Gerardus Cornelis Driessen, and Gerardus Antonius Petrus Maria Cornelissen, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 16, 1977, Ser. No. 778,013

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1976, 7611934

Int. Cl.[2] H01J *7/44*

U.S. Cl. 315—35 **2 Claims**



1. A discharge lamp which comprises: a main discharge tube, an outer envelope enveloping said discharge tube, a circuit for starting a discharge in said discharge tube which includes a capacitor belonging to said circuit disposed between said discharge tube and said outer envelope and a glow discharge starter which includes a bimetal strip, said glow discharge starter being disposed between said main discharge tube and said outer envelope, said glow discharge starter being connected electrically in parallel with both said main discharge and said capacitor.

4,117,371

ELECTRIC DEVICE PROVIDED WITH A METAL VAPOR DISCHARGE LAMP

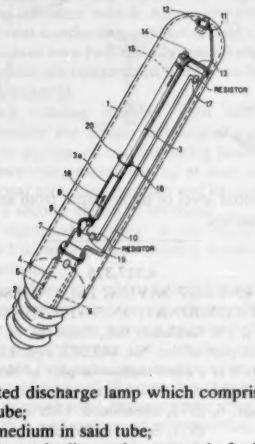
Johannes Adrianus Josephus Maria Van Vliet, and Pieter Hendrik Broerse, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 7, 1977, Ser. No. 757,676

Claims priority, application Netherlands, Jan. 19, 1976, 7600480

Int. Cl.[2] H01J *7/44, 13/46, 19/78;* H01K *1/62*

U.S. Cl. 315—46 6 Claims



1. An elongated discharge lamp which comprises:

a discharge tube;

an ionizable medium in said tube;

a first main electrode disposed at one end of said tube and a second main electrode disposed at the other end of said tube; and

a starting electrode extending about a portion of the circumferential extend of said discharge tube at one axial portion thereof;

said starting electrode being connected via a first resistor to said first electrode and via a second resistor to said second main electrode;

said first resistor having a temperature dependent characteristics which is substantially more positive than said second resistor.

4,117,372

GAS DISCHARGE LAMP WITH DOUBLE-ELECTRODE POWERED THROUGH A RECTIFIER, AND DISCHARGE-TIGHT CROSS-CONNECTION OF THE ELECTRODE CHAMBERS, AND A PROCESS FOR ITS MANUFACTURE

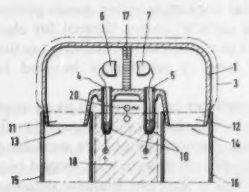
Alfred Walz, Am Kurzarm 7, Emmendingen, Germany (7830)

Filed Nov. 4, 1976, Ser. No. 738,965

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1975, 2549191; Oct. 9, 1976, 2645794

Int. Cl.[2] H01J *7/44, 13/46, 29/19;* H01K *1/62*

U.S. Cl. 315—71 18 Claims



1. In a gas discharge lamp, especially of the fluorescent tube type, powered from an A.C. line through a rectifier, with a double electrode arrangement and a discharge-type cross connection of the electrode chambers, the body of said lamp comprising a pair of substantially straight glass tube sections of equal lengths, said lamp further comprising a gas-discharge-tight passage, the improvement wherein

said glass tube sections are prefabricated and are connected by two prefabricated geometrically equal generally U-shaped end pieces, one of said end pieces having extending thereacross a diaphragm, permeable to metal vapor and constituting said gas-discharge-tight passage, a first electrode holder provided on one side of said diaphragm and a second electrode holder on the other side of said diaphragm, and at least one pump nipple tube being provided in a said end piece.

4,117,373

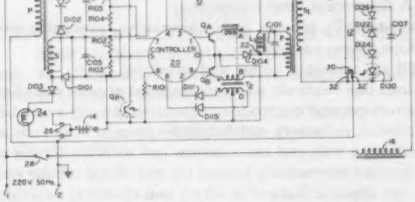
EMERGENCY/NORMAL LIGHTING CIRCUIT FOR A GASEOUS DISCHARGE LAMP

Robert P. Alley, Danville, Ill., assignor to General Electric Company

Filed Apr. 28, 1977, Ser. No. 791,702

Int. Cl.[2] H05B *41/14*

U.S. Cl. 315—86 5 Claims



1. A circuit for operating a gaseous discharge lamp, the circuit comprising:

means including a reactor arranged for connection to a source of AC line voltage for operating the lamp at power frequency during normal conditions when the AC line voltage is above a first predetermined level;

means including an inverter connected to a source of DC electrical energy for starting the lamp during normal conditions and for starting and operating the lamp during emergency conditions when the AC line voltage is below a second predetermined level, the inverter supplying AC electrical energy at a frequency substantially higher than the power frequency;

means for controlling the inverter including a first sensor responsive to a signal related to AC line voltage for turning on the inverter when the AC line voltage is below the second predetermined level and for turning off the inverter when the AC line voltage is above the first predetermined level; and

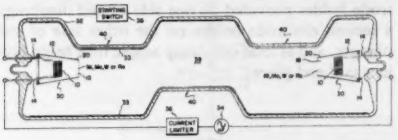
overriding means for turning on the inverter to start the lamp during normal conditions and for turning off the inverter after the lamp is operating from the AC line voltage;

the overriding means including means for monitoring voltage across the lamp and including means for effecting inverter turn-on when voltage across the lamp is above a predetermined level and for effecting inverter turn-off when the lamp becomes operational and the voltage thereacross is below another predetermined level.

4,117,374
FLUORESCENT LAMP WITH OPPOSING INVERSERE CONE ELECTRODES

Harald L. Witting, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 753,771, Dec. 23, 1976, abandoned. This application Feb. 28, 1978, Ser. No. 882,105
Int. Cl.[2] H01J *1/16, 61/09*
U.S. Cl. 315—99 **14 Claims**



1. In an electrode structure, which includes an improved cathode for an electric discharge emanating from substantially a single direction, comprising:

a refractory metal cylinder, open at both ends and having inner and outer surfaces; and

an emissive mix coated filament centrally disposed within said cylinder; the improvement wherein

said cylinder comprises a truncated conical structure having a wide end and a narrow end with the narrow end thereof directed toward the electric discharge, whereby a transition, from a termination of the electric discharge on the filament, to a termination of the electric discharge on the cylinder, is hastened.

8. A fluorescent lamp comprising:

a substantially tubular, light-transmissive, evacuable envelope having two ends;

a fill gas contained within said envelope;

at least one electrode structure disposed at each end of said envelope, said electrode structure comprising a truncated conical, refractory metal cylinder open at both ends and having a wide end and a narrow end with the narrow end directed substantially toward the end of said tubular envelope opposite that end in which said electrode structure is disposed, said electrode structure also possessing an emission mix coated filament centrally disposed within said cylinder; and

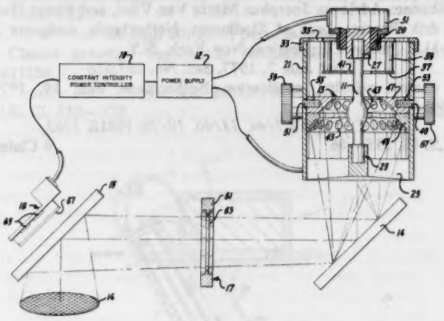
means for establishing and maintaining an electric discharge between said electrode structures.

4,117,375
EXPOSURE SYSTEM

Gerald Bachur, San Jose, and George E. Richardson, Santa Clara, both of Calif., assignors to Optical Associates, Incorporated, Santa Clara, Calif.

Division of Ser. No. 578,915, May 19, 1975, Pat. No. 4,024,428. This application Dec. 15, 1976, Ser. No. 750,669
Int. Cl.[2] H05B *37/02, 41/38*
U.S. Cl. 315—151 **5 Claims**

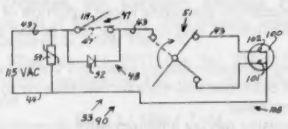
1. An exposure system comprising a short arc mercury lamp, a power supply for driving said lamp at an idle level which optimizes the life of said lamp, means for directing light from said lamp through a light path to an exposure plane, shutter means in the light path for controlling the exposure period during which light from said lamp reaches the exposure plane, light detector means in the light path on the opposite side of said shutter means from said lamp for detecting the intensity in a predetermined wavelength spectrum during the exposure period, said predetermined wavelength spectrum being selected to provide a spectral response which is related to the spectral response of the photosensitive material being exposed in the exposure plane, and a control circuit connected to said power supply, said control circuit being responsive to said light detector means for adjusting said power supply to provide a preselected level of light output from said lamp during the exposure period.

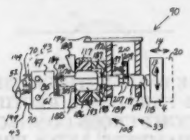


4,117,376
ELECTRIC ENERGY SAVING INCANDESCENT LAMP SOCKET COMBINATION SWITCHING DEVICE

Peter Andrews, 190 Gebhardt Rd., Penfield, N.Y. 14526

Continuation-in-part of Ser. No. 442,082, Feb. 12, 1974, Pat. No. 4,005,334, which is a continuation-in-part of Ser. No. 240,605, Apr. 3, 1972, abandoned, which is a continuation-in-part of Ser. No. 25,994, Apr. 6, 1970, abandoned. This application Jan. 24, 1977, Ser. No. 761,665
Int. Cl.[2] H05B *39/04*
U.S. Cl. 315—200 R **21 Claims**





1. An electrical energy saving improved lamp socket switching means for providing a half-wave rectified and a full-wave of electric current to an incandescent lamp, comprising in combination:

a said lamp contact shell means positioned on a disc-like member of electrical insulating material having at least one electrical contact member means protruding through at least one surface portion thereof for electrical contact with at least one electrical contacting portion of said lamp when said lamp is removably inserted into said shell means;

said disc-like member being secured to an insulating housing member which substantially houses a first switching means in one portion thereof for switching electric current which is passed thereto by a second switching means, substantially to at least one filament member of said lamp;

said second switching means having a switch supporting portion substantially housed in at least one portion of said insulating housing member;

said first switching means having a rod-like member having a first end portion thereof rotatingly supported by at least

one electrical insulating member means which is substantially housed in said insulating housing member;

said first end portion of said rod-like member extends out of and beyond an outer diameter portion of said insulating housing member for manual switching rotation and axial switching movement thereof;

said rod-like member also having a generally center portion and a generally end portion which has at least one diameter portion thereof coined outwardly to form at least one generally flat ear-like member which substantially slides substantially captively and also axially key-like within a correspondingly matching key-like opening in an insulating rotating member which has a one-piece rotatable electric current conducting contact member which rotatingly contacts at least two radially spaced electric contact members which are constructed from a resilient electrical conducting material;

said insulating rotating member with said conducting contact member are axially substantially captively retained in one portion of said insulating housing member;

said second switching means having at least one "off" and "on" electrical switching position and having at least two a first and a second electrical terminal;

said second electrical terminal is electrically connected ahead of and to one electrical passing member of said first switching means;

said first and said second said terminal having a half-wave diode electric rectifying means electrically connected thereto for alternatingly passing either a half-wave rectified "dim" or a full-wave "on" portion of said electric current to said first switching means when an outer end edge portion of said rod-like member is axially moved by exerting a manual axial force on said first end portion thereof so that said outer end edge portion will thereby depress and release a switch actuating member of said second switching means;

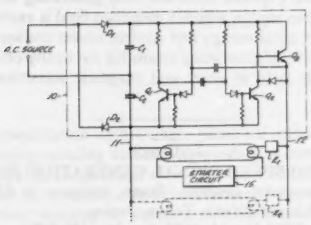
said first switching means having an electrical "off" switching position and at least one "on" electrical switching position when said first end portion of said rod-like member is manually switchingly rotated.

4,117,377

CIRCUITS FOR STARTING AND OPERATING IONIZED GAS LAMPS

Bruce D. Jimerson, 2131 Grenadier Dr., San Pedro, Calif. 90732, and Henry H. Nakasone, 1672 Camrose Way, Anaheim, Calif. 92802

Filed Jan. 14, 1976, Ser. No. 648,909
Int. Cl.[2] H05B *37/02, 39/04, 41/36*
U.S. Cl. 315—209 R **9 Claims**



1. A system for operating an ionized gas lamp of the type having a pair of heated filament electrodes comprising:

capacitor-rectifier doubler means operatively connected to an A.C. source for producing a D.C. potential equal to the peak-to-peak voltage of the A.C. source;

bidirectional chopper means operatively connected to the output of said capacitor-rectifier doubler for alternately switching the potential across the gas lamp between said D.C. potential and the reference by which it is measured so as to produce a rectangular wave having a frequency at least twice that of the frequency of the A.C. source;

impedance means operatively connected in series between the output of said chopper means and one of said gas lamp filament electrodes, said impedance means having a value in accordance with the frequency of said chopper means sufficient to limit the current in the ionized gas lamp to a predetermined rated value;

circuit means operatively connected across said gas lamp filament electrodes for heating said filaments and producing an overall ionization field during starting; said circuit means comprising

voltage responsive means operatively connected across the electrode of the gas lamp for producing a potential having a magnitude which is dependent upon the state of the gas lamp; and

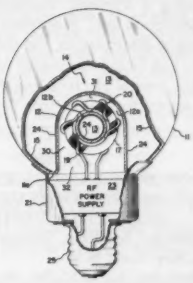
starting means operatively connected to said voltage responsive means for heating the filaments of the lamp and for producing an ionization field within the gas lamp prior to starting.

4,117,378

REFLECTIVE COATING FOR EXTERNAL CORE ELECTRODELESS FLUORESCENT LAMP

Homer H. Glascock, Jr., Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 11, 1977, Ser. No. 776,588
Int. Cl.[2] H05B *41/16, 41/24*
U.S. Cl. 315—248 **10 Claims**



1. In a solenoidal electric field, fluorescent lamp comprising an evacuable, light-transmissive, substantially globular envelope having a channel; a gaseous medium within said envelope adapted to sustain an electric discharge due to an electric field induced therein, said ionizable medium emitting ultraviolet radiation when sustaining said discharge; a closed loop magnetic core having a central opening and being at least partially contained within said channel whereby said core links said gaseous medium; means for inducing said electric field in said gaseous medium; and luminous phosphors disposed on interior surfaces of said envelope and adapted to emit visible light when excited by said ultraviolet radiation; the improvement comprising:

an ultraviolet-radiation-reflective coating disposed on inner surfaces of said envelope adjacent said magnetic core.

4,117,379

METHOD OF ADJUSTING A MAGNETIC DEFLECTION UNIT OF A CATHODE RAY TUBE, CATHODE RAY TUBE HAVING A DEFLECTION UNIT OR REFERENCE POINTS ADJUSTED ACCORDING TO SAID METHOD, AND A DEFLECTION UNIT PROVIDED WITH REFERENCE POINTS ADJUSTED ACCORDING TO SAID METHOD

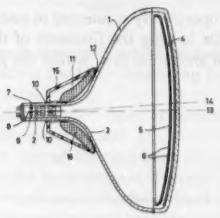
Jan Bijma, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 16, 1977, Ser. No. 807,167

Claims priority, application Netherlands, Jul. 7, 1976, 7607472

Int. Cl.[2] H01J *29/56*

U.S. Cl. 315—370 **18 Claims**



1. A method of adjusting a magnetic deflection unit around the neck and the funnel-shaped part of the envelope of a cathode ray tube of the in-line-type for displaying color pictures, which neck has three electron guns situated in one plane and in which opposite to said electron guns a display screen is situated, said method comprising sliding the deflection unit around the neck until the desired axial position is obtained, rotating said unit around the axis of the cathode ray tube until the frame and line deflection take place in the desired direction, and centering the side of said unit remote from the display screen substantially around a point on the axis of the central electron gun by generating a dynamic magnetic multipole field by means of the deflection unit, generating an electron beam by means of the central electron gun, and thereafter tilting the side of the deflection unit facing the display screen around the point on the axis of the central electron gun until a dot is displayed on the display screen by the electron beam.

4,117,380

TRANSFORMER ARRANGEMENT FOR SYNCHRONOUSLY SWITCHED VERTICAL DEFLECTION SYSTEM

Willem den Hollander, Schlieren, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed Aug. 12, 1977, Ser. No. 824,101

Claims priority, application United Kingdom, Nov. 15, 1976, 47545/76

Int. Cl.[2] H01J *29/70, 29/76*

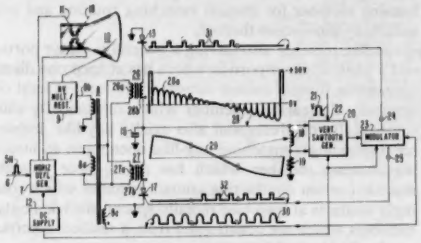
U.S. Cl. 315—393 **12 Claims**

11. A deflection drive and power supply arrangement for a display transducer, comprising:

line deflection means for producing recurrent line deflection at a line deflection rate;

power supply means including first transformer means the primary of which is coupled to an output of said horizontal deflection circuit for supplying power to a varying load;

field deflection means for applying progressively smaller portions of the energy of said line deflection means to said display transducer during the first part of the field deflection interval and for applying progressively greater portions of the energy of said line deflection means to said display transducer during the second part of the field deflection interval, said energy being coupled from said line deflection means to said display transducer by way of



second transformer means independent of said first transformer means.

4,117,381

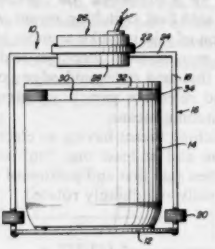
VIBRATOR

Franklin C. Pereny, Lancaster, N.Y., assignor to Stanley Truxell, Lancaster, N.Y., a part interest

Filed Aug. 24, 1977, Ser. No. 827,314

Int. Cl.[2] H02K *33/02*

U.S. Cl. 318—120 **6 Claims**



1. An electromagnetic device comprising a base, a movable frame yieldably supported on the base, a relatively massive body fixedly secured to the base, magnetic field generating means fixedly mounted on the frame in spaced relation to the body, an armature displaceable under magnetic attraction toward said field generating means, elastically deformable means connecting the armature to the body for yieldably holding the armature spaced from said field generating means by a variable air gap within which a magnetic field is established, a source of electrical energy and control means connecting said source to the field generating means for cyclically establishing said magnetic field to exert said magnetic attraction on the armature.

4,117,382

COMMAND SPEED SIGNAL GENERATION SYSTEM

Masashi Yonemoto, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 3, 1975, Ser. No. 628,248

Claims priority, application Japan, Nov. 7, 1974, 49-128617

Int. Cl.[2] G05B *19/02;* H02P *7/18*

U.S. Cl. 318—163 **2 Claims**

1. A command speed signal generation system for a moving member and more particularly for an elevator car comprising, in combination,

a source of direct current including a pair of poles;

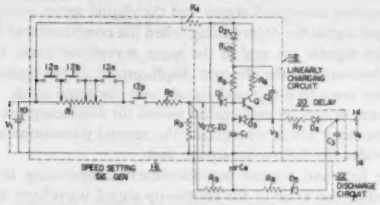
first resistor means connected to one of the poles of said source of direct current;

a plurality of contact sets serially interconnected across said

first resistor means, and means for simultaneously closing said plurality of contact sets during the acceleration of a moving member and for successively opening them during the deceleration thereof;

second resistor means connected between said first resistor means and the other pole of said source of direct current;

a Bootstrap circuit including amplifier means having an input connected to the junction of said first and second resistor means;



a first directional element connected between said junction of said first and second resistor means and the input of said amplifier means;

a time delay element connected to said amplifier means at the output thereof; and

discharge means connected between the output of said time delay element and said junction of said first and second resistor means including a second directional element for causing said discharge means to operate only during the deceleration of the moving member.

4,117,383

ELECTRICAL CONTROL CIRCUITS

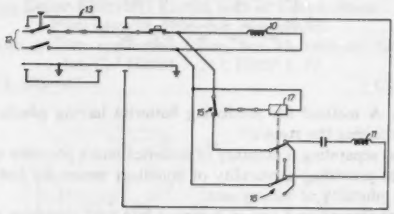
Dennis Malcolm Hussey, and William Martin John Coleman, both of Ross-on-Wye, England, assignors to The Haigh Engineering Company Limited, Ross-on-Wye, England

Filed Apr. 20, 1977, Ser. No. 789,251

Claims priority, application United Kingdom, Apr. 27, 1976, 16987/76

Int. Cl.[2] **H02P** *1/40*

U.S. Cl. 318—206 A **2 Claims**



1. In combination with a single phase induction motor having a starting winding and a main winding, a motor reversing control circuit comprising:

(a) a set of reversing contacts electrically connected to the starting winding of the motor, certain of said contacts causing motor operation in a forward direction and certain other of said contacts causing motor operation in a reverse direction;

(b) an impulse relay connected to said reversing contacts and operable to alternately reverse said contacts; and

(c) a centrifugal switch connectable in a first position between said set of reversing contacts and a source of power and in a second position between said relay and a source of power, whereby at a predetermined motor speed the centrifugal switch moves from its first position to its second position to de-energize the starting winding and energize the impulse relay whereby the contacts are reversed for reversal of the motor at the next energization of same.

4,117,384

TACHOGENERATOR PROCESSING CIRCUITS AND MOTOR SPEED CONTROL SYSTEMS INCLUDING SUCH CIRCUITS

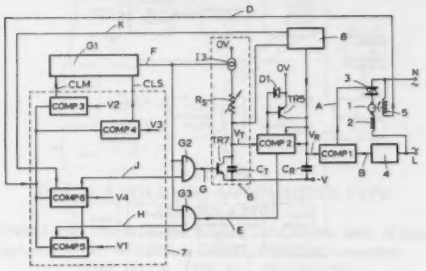
Desmond R. Armstrong, Wallington, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 25, 1977, Ser. No. 790,700

Claims priority, application United Kingdom, Apr. 27, 1976, 17014/76

Int. Cl.[2] **H02P** *1/04*

U.S. Cl. 318—326 **13 Claims**



1. A circuit for processing the a.c. output signal of a tachogenerator whose frequency is proportional to the speed of the tachogenerator rotor comprising, voltage level detection means responsive to said a.c. output signal, key pulse producing means responsive to at least one output of the detection means to produce a key pulse in alternate cyclic periods of the a.c. output signal, the duration of said key pulse being inversely proportional to the rotational speed, first gating means responsive to a second output of the detection means and to an output of the key pulse producing means to produce a reset pulse after a predetermined period in the interval between each key pulse, and a voltage generator responsive to each reset pulse to provide a predetermined output level and responsive to each key pulse to ramp that output level at a predetermined rate for the duration of said key pulse, whereby the output level of the voltage generator during each said predetermined period is a predetermined function of the tachogenerator rotational speed.

4,117,385

TRACER CONTROL CIRCUIT

Walter S. Limbach, II, Eighty-four, and George Kusic, Pittsburgh, both of Pa., assignors to Automation Equipment Inc., Pittsburgh, Pa.

Filed Jan. 26, 1977, Ser. No. 762,525

Int. Cl.[2] **G05B** *19/36*

U.S. Cl. 318—578 **10 Claims**

1. In a system for controlling the relative movement between a tracer probe and a template comprising:

a tracer probe that bears upon the template and is deflected substantially normal to the surface of the template at the point of contact,

means for producing deflection signals indicative of the deflection of the probe in selected first and second directions,

drive means for driving the probe in the first and second directions simultaneously,

means for sensing the speed of the probe moving in the said first and second directions and for producing velocity signals,

the improvement comprising:

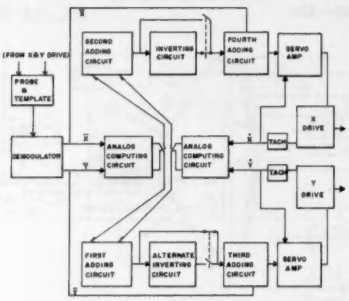
an analog computing circuit for computing the vector sum of deflection signals and for computing normalized drive

signals being the deflection signals divided by the said vector sum,

an analog computing circuit for computing the vector sum of the velocity signals and for computing normalized deflection reference signals being the velocity signals divided by the said vector sum,

first summing means adding a scaled normalized drive signal and a scaled normalized deflection reference signal both corresponding to the first direction,

second summing means adding the other scaled normalized drive signal and the other scaled normalized deflection reference signal both corresponding to the second direction;



means for inverting the sign of the output of the first summing means;

third summing means for adding a scaled deflection signal corresponding to the second direction to the inverted output of the first summing means,

fourth summing means for adding a scaled deflection signal corresponding to the first direction to the output of the second summing means,

means for controlling the drive means for the first direction with the output of the fourth summing means, and

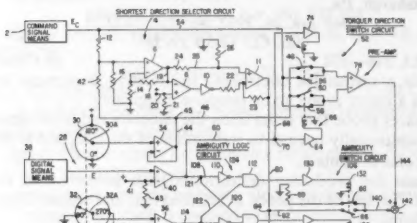
means for controlling the drive means for the second direction with the output of the third summing means.

4,117,386

DIGITAL CONTINUOUS POTENTIOMETER SERVO FEEDBACK ELEMENT

Richard L. Cohen, Matawan, and Richard J. Anderson, Fairfield, both of N.J., assignors to The Bendix Corporation, Teterboro, N.J.

Filed Jul. 21, 1977, Ser. No. 817,637
Int. Cl.[2] G05B *1/06*
U.S. Cl. 318—664 **7 Claims**



1. A digital continuous servo system feedback device comprising:

a first potentiometer having a displaceable arm and a second potentiometer having a displaceable arm and offset from the first potentiometer by a predetermined electrical angle, and providing a follow-up signal in accordance with the displacement of the arms, the follow-up signal having a waveform with a first zone wherein the signal level increases linearly from zero to maximum and a second zone wherein said signal level decreases linearly from maximum to zero;

means for providing a servo system command signal;

means for providing a digital servo system output signal;

circuit means responsive to the follow-up signal, the servo system command signal and the digital servo system output signal for determining when the command and follow-up signals are not in the same waveform zone, and for determining the shortest displacement of the potentiometer arms to bring said signals into the same zone;

means driven by said circuit means for displacing the potentiometer arms, whereupon the second potentiometer provides the follow-up signal; and

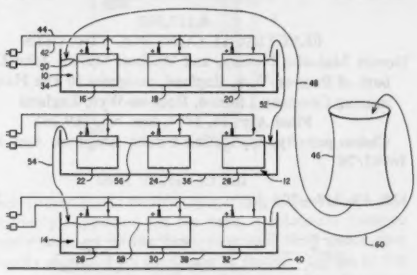
the first and second potentiometers cooperating to determine the zone of the follow-up signal waveform that the servo system is in.

4,117,387

CASCADING-WATER, LEAD-ACID STORAGE BATTERY NEUTRALIZATION FORMING AND CHARGING METHOD

Lawrence Windisch, Selma, Ala.; John Nees, and Harry M. Channing, both of Wyomissing, Pa., assignors to General Battery Corporation, Reading, Pa.

Filed Aug. 3, 1977, Ser. No. 821,527
Int. Cl.[2] H02J *7/00;* **H01M** *10/50*
U.S. Cl. 320—2 **12 Claims**



1. A method for producing batteries having plastic cases comprising the steps of:

(a) separating a plurality of batteries into a plurality of sets;

(b) providing a plurality of container means for holding a plurality of battery sets;

(c) placing said sets of batteries into said container means, one set for each container means and electrically interconnecting said batteries in each set for connection to a separate rectifying means for each set;

(d) stacking said plurality of container means at a plurality of positions at different heights above a forming room floor;

(e) connecting each set of said batteries to said separate rectifying means for charging said plurality of batteries in each set;

(f) continuously providing cooling fluid to fill a first container means to a predetermined level, said first container means being positioned at the greatest height above said forming room floor;

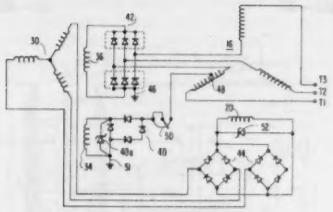
(g) causing said cooling fluid to overflow said first container means and to enter a second adjacent container means located below said first container means; and

(h) causing said overflow cooling fluid to enter each adjacent lower container means of said plurality.

4,117,388
ALTERNATING CURRENT GENERATOR

Lawrence R. Roche, Sioux City, Iowa, assignor to Dyna Technology, Inc., Sioux City, Iowa

Filed Jan. 7, 1977, Ser. No. 757,498
Int. Cl.[2] H02P *9/10*
U.S. Cl. 322—25 **14 Claims**

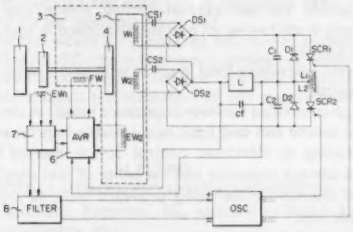


1. A brushless dynamo electric machine comprising:
a generator with a stator winding including a neutral connection at an intermediate point thereof and a rotor field winding;
an exciter including a rotor winding and cooperating control field and compound field windings;
first circuit means including first rectifier means connected to energize said control field winding of the exciter in relation to the voltage of said generator stator winding;
second circuit means including second rectifier means connected to said generator stator winding in close proximity to said neutral connection thereof for energizing said compounding field winding of the exciter in proportion to the amplitude of current in said generator stator winding, and
rotary rectifier means connected to energize said rotor field winding with a D.C. voltage related to the A.C. voltage of said rotor winding.

4,117,389
LOW FREQUENCY HIGH OUTPUT ALTERNATING CURRENT GENERATING DEVICE

Kenji Hazumi, Tokyo, and Katsutoshi Tagami, Asaka, both of Japan, assignors to Sawafuji Electric Co. Ltd. and Honda Giken Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed May 28, 1976, Ser. No. 690,857
Claims priority, application Japan, Jun. 10, 1975, 50/70040
Int. Cl.[2] H02M *5/297*; **H02P** *9/14*
U.S. Cl. 322—47 **6 Claims**

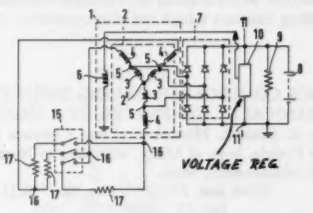


1. An alternating current generating device comprising a high frequency generator having a single inductor which is rotated by an external drive unit, a field winding excited by a DC current, two output windings each providing a continuous wave high frequency output of substantially constant amplitude, rectifying means connected to each of said output windings for rectifying the high frequency output produced in the output windings, conduction control means connected to each of the rectifying means for switching over the output of the rectifying means time selectively alternately to connect to a load, reference signal generating means for applying low frequency control signals to the conduction control means independent of the phase of the high frequency output, said inductor being constructed so as to have a high plurality of teeth and said output windings being magnetically coupled to the inductor, an exciting winding magnetically coupled to the inductor, an output voltage stabilizing means coupled between the exciting winding and the field winding, the voltage stabilizing means responding to the output voltage of the load and providing a corresponding output current which supplies the field winding, said voltage stabilizing means comprising an impedance which varies in accordance with the output voltage of the load.

4,117,390
DOUBLE-VOLTAGE, AUTOMOTIVE-TYPE ALTERNATOR

Yoriaki Iwata, Toyoake, and Suguru Sato, Oobu, both of Japan, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Jul. 28, 1976, Ser. No. 709,255
Claims priority, application Japan, Aug. 9, 1975, 50/110183[U]
Int. Cl.[2] B60L *1/02*
U.S. Cl. 322—90 **6 Claims**

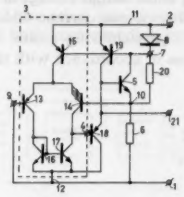


1. Dual-voltage, automotive-type power supply system to provide high-voltage a-c and lower-voltage d-c, comprising
a three-phase a-c generator having an excitable field winding (**6**, **18**, **19**);
a stator (**2**) having a core;
star-connected armature (**3**, **4**) windings on the stator;
the armature windings having first and second armature winding portions (**3**, **4**; **43**, **44**, **53**, **54**) which are located on the same stator armature core (*2a*), and both exposed to the magnetic field from said field winding;
the first armature winding portion (**3**) having fewer turns and being of larger wire than the second armature winding portion (**4**);
a three-phase bridge-type multi-element rectifier (**7**) connected to the first armature winding portion (**3**) and having output terminals (**11**, **11'**) providing low-voltage d-c;
and wherein the two armature winding portions are serially connected, the first armature winding portion (**3**) being commonly connected to the center or star point (**2'**) of the star connection, the other end terminals being connected to a junction which is common with one end terminal of the other armature winding portion (**4**) and further to the input of said three-phase bridge-type rectifier (**7**), the other end terminals of the other armature winding portions (**4**) forming a-c high-voltage output terminals (**16**).

4,117,391
CURRENT STABILIZING CIRCUIT

Daniel Johannes Gerardus Janssen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 10, 1977, Ser. No. 776,866
Claims priority, application Netherlands, Mar. 31, 1976, 7603321
Int. Cl.[2] G05F 1/56
U.S. Cl. 323—4 10 Claims

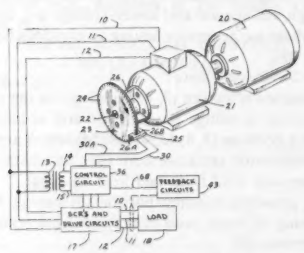


1. A current stabilizing circuit comprising in combination:
a first terminal and a second terminal,
a difference amplifier including a first input connected to the first terminal, a second input, and means which define an offset voltage;
a first resistor connected between the first terminal and the second input of the difference amplifier; and
a first transistor having a drive electrode connected to an output of the difference amplifier and a main current path connected between the second input of the difference amplifier, and an output terminal;
wherein said means which define an offset voltage include a second transistor and a third transistor in which current densities are adjusted to mutually different values and having emitters which are interconnected.

4,117,392
SCR CONTROLLER HAVING INPUT PULSES MECHANICALLY GENERATED BY A SIGNAL SOURCE

Stanley S. Kintigh, Minnetonka, and Clarence D. Lilienthal, Eden Prairie, both of Minn., assignors to Research Incorporated, Minneapolis, Minn.

Filed Jan. 17, 1977, Ser. No. 760,111
Int. Cl.[2] G05F 1/44, 5/00
U.S. Cl. 323—21 7 Claims

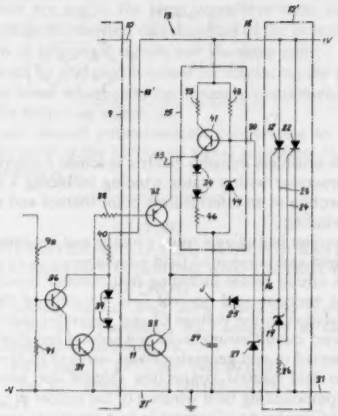


6. A controller for providing output signals referenced to a phase angle of a periodic input signal generated from a rotating element, including digital tachometer means coupled to said rotating element to provide a known number of electrical pulses for each revolution of said rotating element, first means providing a first signal during a cycle of the input signal when the input signal is sensed to be at a desired phase angle, digital counter means including reset means responsive to the first signal and being connected to the digital tachometer to deliver a plurality of output signals digitally referenced to the phase of the rotating element and the input signal.

4,117,393
ELECTRONIC MONITORING SYSTEM WITH LOW ENERGY CONSUMPTION IN QUIESCENT STATE

Robert Buck, Kirchbühlweg 128, 7995 Neukirch, Germany

Filed Apr. 14, 1977, Ser. No. 787,496
Claims priority, application Fed. Rep. of Germany, Apr. 15, 1976, 2616773
Int. Cl.[2] G05F 1/56
U.S. Cl. 323—25 12 Claims



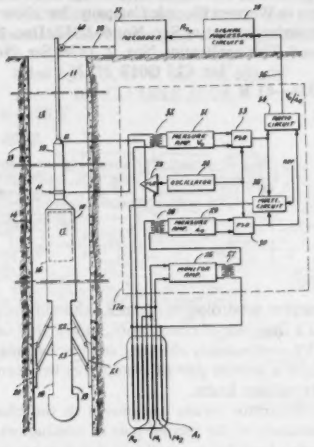
1. An electronic monitoring system comprising:
detector means sensitive to an ambient condition for generating an output signal varying with a change in said condition, said detector means being provided with a pair of power-input terminals;
a voltage-generating network including a storage capacitor and current-limiting means in series therewith, said terminals being connected across said storage capacitor in an energizing circuit for said detector means;
a source of direct current with a pair of supply leads connected across said network for charging said storage capacitor via said current-limiting means, one of said supply leads having an extension included in said energizing circuit;
a current-responsive load in series with said source and said network;
voltage-controlled variable-impedance means in circuit with said source and said load, said variable-impedance means including an electronic control device inserted between said storage capacitor and the other of said supply leads, said control device being provided with an input electrode; and
an operating circuit for said control device including electronic switch means connected between said other of said supply leads and said input electrode, said electronic switch means being provided with input circuitry connected to said detector means for changing the conductivity of said control device in response to variations in said output signal, thereby modifying the energization of said load, said electronic switch means being cut off by said input circuitry under conditions of minimum energization of said load.

4,117,394

WELL LOGGING APPARATUS WITH PAD-MOUNTED VERTICAL ELECTRODE ARRAY FOR MEASURING THE RESISTIVITY OF THE FLUSHED ZONE

Philippe Souhaité, Paris, France, assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Jun. 10, 1977, Ser. No. 805,241
Int. Cl.[2] G01V *3/18*
U.S. Cl. 324—10 **4 Claims**



1. An apparatus for investigating earth formations traversed by a borehole, comprising:

an elongated support member adapted for movement through the borehole;

a wall-engaging rigid pad member carried by said support member and adapted to be urged against the borehole wall;

a plurality of electrodes, at least some of them being linear and mounted on the borehole wall-engaging face of said pad member substantially parallel to the longitudinal axis of said support member and spaced apart along a direction substantially perpendicular to said axis, to form a long narrow array whose dimension in a direction perpendicular to the axis is less than 4 inches and whose dimension in a direction parallel to said axis is substantially three to five times greater than its dimension in a direction perpendicular to the axis;

first circuit means connected to said electrodes for propagating between two electrodes of the pad a survey current primary through the zone of the formation likely to be washed by the borehole fluid; and

second circuit means for measuring said survey current and the potential difference between a remote reference electrode and a point lying between said two electrodes to produce a signal representative of the resistivity of said zone.

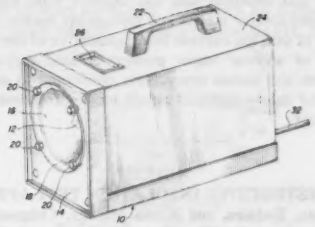
4,117,395

DIGITAL STROBOSCOPE-TACHOMETER

Robert H. Redfield, Evanston, Ill., assignor to Power Instruments, Inc., Skokie, Ill.

Filed May 9, 1977, Ser. No. 795,172
Int. Cl.[2] F02P *17/00*
U.S. Cl. 324—16 T **10 Claims**

1. In a digital stroboscope - tachometer, the combination of, a housing, a flash lamp fixedly mounted in said housing and arranged to direct light flashes from one end of said housing to illuminate a rotating object when said housing is aimed generally in the direction of said rotating object, a manually controllable oscillator within said housing for developing an output signal having a repetition rate equal to the desired flash rate of said lamp measured in revolutions per minute, frequency divider means in said housing and controlled by said output signal for developing a control signal having one-sixtieth the repetition rate of said output signal, means responsive to said control signal for controlling said flash lamp to emit pulses of



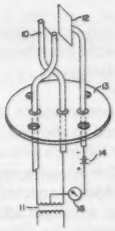
light at the repetition rate of said control signal, counter means in said housing, means for periodically energizing said counter means to count the repetition rate of said oscillator output signal, and display means controlled by said counter means for digitally displaying the output of said counter means in revolutions per minute.

4,117,396

SENSOR FOR THERMALLY IONIZABLE PARTICLES AND/OR VAPORS

Edgar Berkey, Murrysville; William H. Reed, III, Monroeville, and William M. Hickam, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 21, 1974, Ser. No. 435,389
Int. Cl.[2] G01N *27/00;* E21B *11/02*
U.S. Cl. 324—33 **2 Claims**



1. A sodium vapor detector, comprising, a heated thermal ionizer means adapted to respond to impinging sodium vapor present in a carrier gas by ionizing sodium atoms to produce positive ions, said thermal ionizer means comprising a heated element having composition characteristics to produce an ion current in accordance with the following equation:

$$I\ (\text{amps}) = \frac{(1.6 \times 10^{-19})\,(\pi DL\nu P_{Na}}{(1 + \frac{1}{\exp\,(11606\,[\omega - IP]/T)})}$$

where:

I = measured current, amps

D = element diameter, cm

L = element length, cm

P_{Na} = partial pressure of sodium, atm

ω = work function of the element, V

IP = ionization potential of sodium, V

T = temperature of element, ° K.

$\nu = (3.513 \times 10^{22})\,P\,(MT^{*})^{-\frac{1}{2}}$, number of molecules/cm^{2}sec

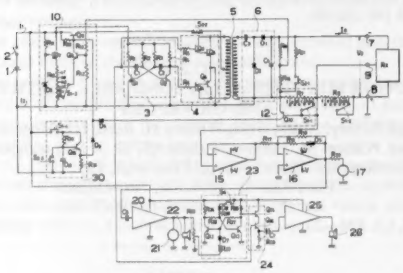
where:

P = gas pressure, mm
M = molecular weight of carrier gas
T° = temperature of carrier gas, ° K.—, and anode means spaced apart from said thermal ionizer means, means for applying an electrical potential between said thermal ionizer means and said anode means to attract said positive ions and establish said ion current flow between said thermal ionizer means and said anode means, the magnitude of said ion current being indicative of the concentration of sodium vapor present at said thermal ionizer means, and means operatively connected to said thermal ionizer means and said anode means to monitor said ion current.

4,117,397
NON-DESTRUCTIVE INSULATION TEST APPARATUS

Isao Fukao, Kodaira, and Kimio Monma, Chigasaki, both of Japan, assignors to Nihon Seimitsu Keisoku, Osaka, Japan

Filed Nov. 5, 1976, Ser. No. 739,137
Claims priority, application Japan, Feb. 20, 1976, 51/17021
Int. Cl.[2] G01R *31/14*
U.S. Cl. 324—54 **2 Claims**

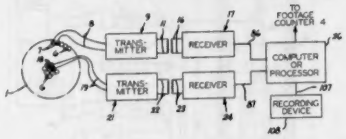


1. An apparatus for non-destructively testing the insulation of a test piece, the insulation characterized by an internal capacitance and comprising:
a DC voltage source;
a voltage controller connected to the voltage source;
an oscillator connected to the voltage controller;
a step-up transformer having a primary side connected to the output of the oscillator, and a secondary side;
a rectifier having an input connected to the secondary side of the transformer and an output adapted to be connected to the test piece for applying a rising d.c. voltage across the insulation of the test piece to cause a charging current to flow into the internal capacitance of the insulation of the test piece;
current limiter means connected to the rectifier and to the voltage controller for continuously operating the voltage controller to initially limit the charging current to a predetermined safe value in response to the instantaneous value of charging current and thereafter maintain the charging current constant and equal to the predetermined value until the d.c. voltage applied across the test piece has been raised to a rated output voltage;
insulation resistance indicating means connected to the current limiter for evaluating the insulation resistance of the test piece from the output current values after the d.c. voltage applied across the test piece has been raised to the rated output voltage and to indicate the insulation resistance value for determining a polarization index for the insulation; and
change-over switch means for changing over and setting the rated output voltage across the test piece in a stepped manner;
whereby the charging of the test piece and the raising of the applied voltage to the rated output voltage can be completed rapidly and a reliable value can be determined for the polarization index.

4,117,398
METHOD AND APPARATUS FOR MEASURING THE FILLING EFFECTIVENESS OF A CABLE DURING FILLING

James Alphus Hudson, Jr., Atlanta; Raymond Alexander Levandoski, Doraville, and Allen Kyle Long, Roswell, all of Ga., assignors to Western Electric Company, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 642,852, Dec. 22, 1975, abandoned. This application Nov. 2, 1976, Ser. No. 737,752
Int. Cl.[2] G01R *27/26*
U.S. Cl. 324—61 R **11 Claims**

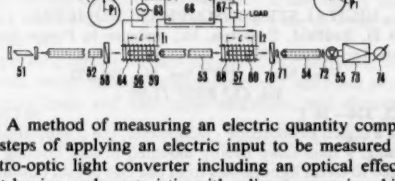


8. Apparatus according to claim 7, wherein the pair of conductors is a first pair of conductors, and further including:
means for continuously charging and discharging the capacitance of a second pair of conductors between upper and lower voltage limits;
third comparator means responsive to the charge on the capacitance of the second pair of conductors reaching a charging limit for generating a signal to reverse the voltage applied to the capacitance;
fourth comparator means for providing an indication when the charge on the capacitance of the second pair of conductors exceeds the upper and lower voltage limits;
means for generating a second pulse train in the absence of such an indication from said fourth comparator means; and
means for counting the pulses generated between such indications, the number of pulses indicating the charging and discharging times of the capacitance of the second pair of conductors.

4,117,399
METHOD AND APPARATUS FOR MEASURING ELECTRIC QUANTITIES BY USING LIGHT CONVERTERS

Yutaka Ono, Tokyo; Yoichi Fujii, Nagareyama; Koji Yokoyama, and Toshifumi Igarashi, both of Tokyo, all of Japan, assignors to Yutaka Ono; Yoichi Fuji and Goro Eto, all of, Japan

Filed Mar. 30, 1977, Ser. No. 782,882
Claims priority, application Japan, Mar. 31, 1976, 51-35591
Int. Cl.[2] G01R *31/00*
U.S. Cl. 324—96 **10 Claims**



1. A method of measuring an electric quantity comprising the steps of applying an electric input to be measured to an electro-optic light converter including an optical effect element having a characteristic with a linear range in which an output electric signal is produced by said light converter which varies with changes in said electric input to be measured, said electric input to be measured having an amplitude

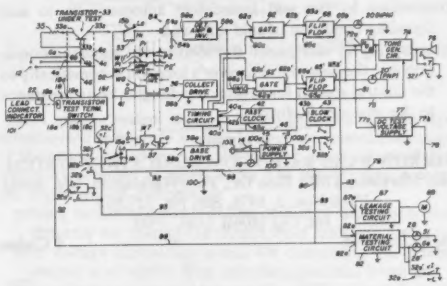
exceeding the linear range of said characteristic, adding the number of the peaks of the output electric signal which reaches a predetermined maximum amplitude to the magnitude of peaks of the output electric signal not reaching said maximum amplitude, and deriving an indication of the sum thereof as a measure of the magnitude of said input electric quantity.

4,117,400

CIRCUIT FOR TESTING TRANSISTORS OR THE LIKE

Harold Feldman, Skokie, Ill., assignor to Dynascan Corporation, Chicago, Ill.

Filed Apr. 29, 1976, Ser. No. 681,487
Int. Cl.[2] G01R *31/26*
U.S. Cl. 324—158 T **18 Claims**



1. Apparatus for testing the current gain of transistors or the like, said apparatus comprising test device connecting terminals to be connected to the respective terminals of a transistor device or the like to be tested in-circuit or out-of-circuit; an intermittently occurring, load terminal energizing voltage source means; an intermittently occurring, control terminal driving voltage source means; said voltage sources when applied to the proper load and control terminals of transistor devices or the like producing load current transitions indicative of the current gain thereof; means for selectively providing relatively high and low drive levels from the proper connection of said voltage source means to the load and control terminals of the transistor device or the like being tested said low drive level providing a load current transition of at least a given level for transistor devices having a forward current gain only above a given minimum value when the device is in a circuit having a shunting impedance of a given value but fails to provide a load current transition of said given level when said circuit has a very low shunting impedance of a fraction of said value, said high drive level providing a load current transition of at least said given level for most transistor devices having a current gain of at least about said value when the transistor devices or the like are in a circuit providing said very low shunting impedance; and current gain detecting means for detecting and indicating the occurrence of a load current transition of at least said given level.

4,117,401

POSITION TRANSDUCER, PARTICULARLY TO DETERMINE THE INSTANTANEOUS ANGULAR POSITION OF A ROTATING SHAFT, ESPECIALLY OF AN INTERNAL COMBUSTION ENGINE

Wolfram Glauert, Bamberg, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Mar. 17, 1977, Ser. No. 778,675
Claims priority, application Fed. Rep. of Germany, May 7, 1976, 2620134
Int. Cl.[2] G01R *33/12, 11/02*
U.S. Cl. 324—208 **9 Claims**

1. Position transducer, particularly to determine the instantaneous angular position of a rotating shaft, comprising

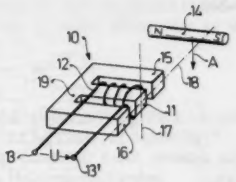
a magnetic element (**14**) rotating with the shaft and

a fixed pick-up transducer (**10**) including

a pick-up coil (**12**) in fixed location with respect to the shaft and in magnetic flux relation with respect to the rotating element (**14**),

wherein,

the fixed pick-up transducer comprises an E-shaped core having outer legs (**15, 16**) and a central leg (**11, 21, 25**), the



pick-up coil (**12**) being located on the central leg (**11, 21, 25**);

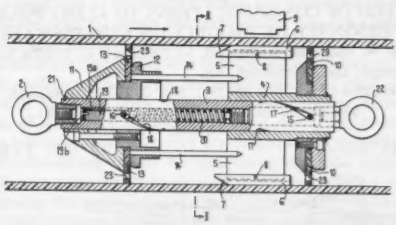
and wherein the magnetic element (**14**) is movable in the plane transverse to the plane of the E-shaped core and has a width less than the spacing between the inner edges of the outer legs (**15, 16**) to face essentially only the central leg (**11, 21, 25**) of the core.

4,117,402

APPARATUS FOR MEASURING THE WALL THICKNESS OF A MOVING TUBE WHEREIN AT LEAST ONE MEASURING BODY INSIDE THE TUBE MAY BE LIFTED OFF THE TUBE BY THE MOTION OF THE TUBE

Heinrich Zangger, Orpund, and Heinz Zumbach, Biel, both of Switzerland, assignors to Zumbach Electronic AG., Orpund, Switzerland

Filed May 2, 1977, Ser. No. 793,058
Claims priority, application Fed. Rep. of Germany, May 10, 1976, 2620560
Int. Cl.[2] G01R *33/12*
U.S. Cl. 324—220 **19 Claims**



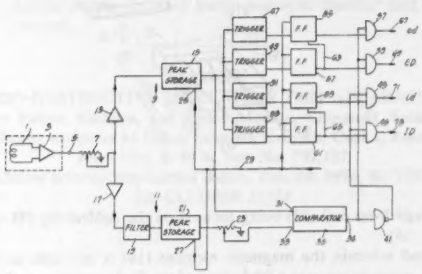
1. Apparatus for measuring the wall thickness of a moving tube, comprising at least one measuring body, a support adapted for location in a stationary position within said moving tube, means for resiliently applying said measuring body against the inner surface of the wall of said tube as the tube moves relatively thereto, a measuring sensor for location externally of the tube wall in order to sense the position of the measuring body and thus the wall thickness of the tube, a holder displaceable relatively to said support in the direction of the axis of the tube and supporting control means arranged to bear against the inner wall surface of the tube and to slide thereon, and mechanical linkage means between said holder and said measuring body, said control means and holder being adapted to be axially displaced relatively to said support by forces transmitted thereto from said tube, and said measuring body being removable from the tube wall through said linkage means upon axial displacement of said holder.

4,117,403

SINGLE MAGNETIC STRAY FIELD SENSOR WHOSE SIGNALS ARE DIFFERENTLY ATTENUATED IN TWO CHANNELS AND THEN COMPARED

Friedrich M. O. Forster, and Alfons Kalisch, both of Reutlingen, Fed. Rep. of Germany, assignors to Institut Dr. Friedrich Forster, Prufgeratebau, Reutlingen, Fed. Rep. of Germany

Filed Mar. 23, 1977, Ser. No. 780,401
Int. Cl.[2] G01R *33/12*
U.S. Cl. 324—240 **12 Claims**



1. A method of magnetic defects inspection of tubes in which the tubes are magnetized and the tube surfaces are scanned by a single magnetic sensing element for magnetic stray fluxes resulting from defects in the tube wall, the stray flux signals generated in the single sensing element being fed to first and second channels, of which the first channel passes analog stray flux signals produced by internal defects and external defects, whereas the second channel passes said stray flux signals of internal and external defects attenuated as compared with those occurring in the first channel, and the signals of the two channels are temporarily stored, which comprises:

storing the analog signals of the first and second channels; and

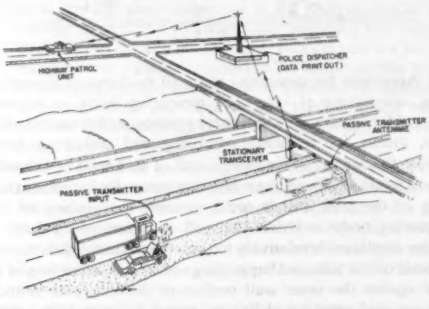
comparing the stored signals with one another, the location of the defect in the tube wall generating the defect stray flux being determined by the relative magnitude of said signals.

4,117,404

SYSTEM OF COMMUNICATIONS TO ALERT POLICE PERSONNEL OF TROUBLE ON EXPRESSWAYS

Arthur N. Marshall, Richmond, Va., assignor to Traffic Safety Systems, Inc., Richmond, Va.

Continuation of Ser. No. 286,087, Sep. 5, 1972, abandoned. This application Jul. 25, 1975, Ser. No. 599,118
Int. Cl.[2] H04B *7/26*
U.S. Cl. 325—1 **3 Claims**



1. A method of notifying a control station for summoning assistance to motorists or vehicles in distress on a highway by an occupant of an approved vehicle, the steps of:

moving the approved vehicle along said highway having predeterminedly spaced transceivers therealong;

actuating a unit on said approved vehicle by an occupant of the approved vehicle when a motorist or vehicle in distress is observed by said occupant to transmit a signaling condition of said unit indicative of the distress situation and of the approved vehicle identification which continues for a predetermined period of time sufficient for said vehicle to pass a said transceiver based on the distance between said transceivers;

signaling by said occupant to the distressed motorist on passing that help is being sent for;

continuing movement of the approved vehicle along said highway until said approved vehicle passes a said transceiver;

receiving said transmitted signaling condition at the said transceiver when said approved vehicle is in range of said transceiver;

responding by the said transceiver automatically to said signaling condition of said unit; and

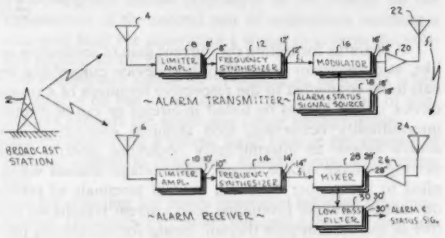
transmitting by said passed transceiver said signaling condition and the passed transceiver's location automatically to the control station for further handling to bring assistance to the motorist in distress.

4,117,405

NARROW-BAND RADIO COMMUNICATION SYSTEM

Louis Martinez, 12011 Bion Dr., Fort Washington, Md. 20022

Filed Nov. 2, 1976, Ser. No. 737,902
Int. Cl.[2] H04B *1/00, 7/00*
U.S. Cl. 325—58 **9 Claims**



3. A narrow-band radio cummunication system for use in connection with a broadcast signal from an existing radio braodcast station operating on a predetermined carrier frequency, comprising:

(A) a transmitter system comprising:

(1) first means for receiving the broadcast signal,

(2) first frequency synthesizer responsive to the received broadcast signal for generating a first synthesized signal at a frequency locked at a predetermined multiple, other than a unity multiple, of the predetermined carrier frequency of thebroadcast signal,

(3) a signal source for providing an information signal,

(4) means for modulating the information signal on the first synthesized signal to provide a modulated synthesized carrier, and

(5) means for transmitting the modulated synthesized carrier, and

(B) a receiver system comprising:

(1) second means for receiving the broadcast signal,

(2) second frequency synthesizer responsive to the received broadcast signal for generating a second synthesized signal at a frequency locked at the same predetermined multiple of the predetermined carrier frequency of the broadcast signal,

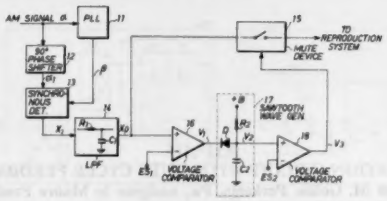
(3) means for receiving the modulated synthesized carrier, and

(4) demodulator means responsive to the second synthesized signal and the modulated synthesized carrier for deriving a detected signal proportional to said information signal.

4,117,406
MUTING ARRANGEMENT FOR AM SYNCHRONOUS DETECTOR USING A PLL CIRCUIT

Susumu Takahashi, Tokyo, and Hiroshi Iida, Machida, both of Japan, assignors to Sansui Electric Co., Ltd., Tokyo, Japan

Filed Mar. 29, 1977, Ser. No. 782,355
Claims priority, application Japan, Mar. 31, 1976, 51-35529
Int. Cl.[2] H04B 1/16
U.S. Cl. 325—348 **7 Claims**



1. A muting system wherein an amplitude modulated signal is connected as input to a phase locked loop circuit, the output of the phase locked loop circuit and the amplitude modulated signal are supplied as inputs to an AM synchronous detector, the improvement comprising:

muting means coupled with the output of said synchronous detector for muting the output from said detector;

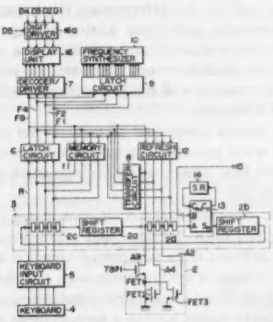
first voltage comparing means for comparing the detector output level with a first reference potential level; and

control means coupled between the output of said first voltage comparing means and said muting means for causing said muting means to immediately mute the detector output when the detector output level falls below the first reference potential level and to stop the muting of the detector output after a predetermined retardation when the detector output level exceeds the first reference potential level.

4,117,407
FREQUENCY SYNTHESIZER TUNER

Hiromi Kusakabe, Yokohama, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Apr. 29, 1976, Ser. No. 681,698
Claims priority, application Japan, Apr. 30, 1975, 50-52337; Apr. 30, 1975, 50-52341; Apr. 30, 1975, 50-52346; Jul. 18, 1975, 50-52356; Jul. 18, 1975, 50-87919
Int. Cl.[2] H04B 1/06
U.S. Cl. 325—455 **7 Claims**

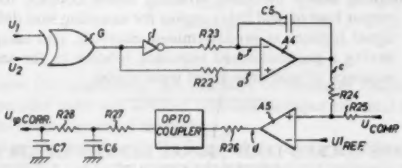


1. A frequency synthesizer tuner comprising a dynamic shift register including first and second shift registers connected in a loop, wherein an information is written into and read out of said dynamic shift register and circulated therethrough by clock pulses, an output circuit including a display unit and a frequency synthesizer to which the information read out of said first shift register is supplied through a latch circuit, a memory circuit connected to the output of the latch circuit and having an output connected to the input of said latch circuit, a transfer circuit connected between said first and second shift registers for transferring the information from the first shift register into the second shift register for repeatedly supplying the information of said output circuit to said second shift register, a refresh circuit connected between said latch circuit and said second shift register, and a keyboard and a keyboard input circuit for applying an input information to said first shift register.

4,117,408
APPARATUS FOR INDICATING THE LOADING OF AN ELECTRIC AC MOTOR

Anders Per Philip Comstedt, Lund, Sweden, assignor to AB Scaniainventor, Helsingborg, Sweden

Filed May 6, 1977, Ser. No. 794,688
Int. Cl.[2] H03D 3/02; H02P 5/00
U.S. Cl. 328—133 **1 Claim**



1. An apparatus for producing a signal indicating the loading of an electric AC motor, especially an asynchronous motor, comprising circuit means for producing a first alternating voltage signal of fixed phase position relative to the motor current and a second alternating voltage signal of fixed phase position relative to the motor voltage; phase detector means coupled to said circuit means for generating a train of pulses of a width proportional to the phase difference between the first and second alternating voltage signals; rectifier means for generating a direct voltage signal of a magnitude proportional to the amplitude of the motor voltage; and means connected to said phase detector means and said rectifier means for generating the load indicating signal; said means connected to said phase detector means and said rectifier means including pulse width modulating means for modulating the pulse width of the pulses in the pulse train from said phase detector means by means of the direct voltage signal from said rectifier means, and a low-pass filter receiving the output signal of said pulse width modulating means for generating the load indicating signal; said pulse width modulating means including a circuit integrating the output signal of said phase detector means and the complementary signal thereof for generating a trapezoidal wave form signal, an adding circuit for adding the trapezoidal wave form signal and the direct voltage signal of said rectifier means, and a comparator for comparing the output signal of said adding circuit with a reference signal and generating a binary signal for supplying said low-pass filter.

4,117,409
SIGNAL SAMPLING SYSTEM

Edwin L. O'Brien, Fullerton, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

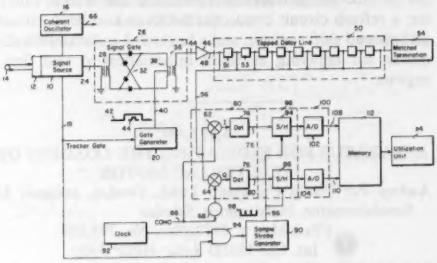
Continuation of Ser. No. 640,600, Dec. 11, 1975, abandoned.
This application Apr. 25, 1977, Ser. No. 790,525
Int. Cl.[2] H03K 5/00
U.S. Cl. 328—151 **17 Claims**

1. A signal sampling system responsive to an informational input signal comprising:

a time gate responsive to said informational input signal for

time gating said input signal over a selected interval having a predetermined sample sequence of sample intervals over said gating interval,

delay means responsive to said time gated informational input signal for forming a selected number of delayed signal replicas of said informational signal thereof and having an output lead; and



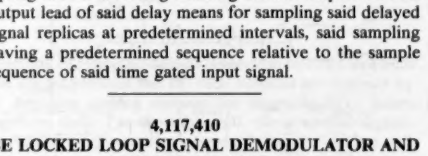
sampling means including strobing means coupled to said output lead of said delay means for sampling said delayed signal replicas at predetermined intervals, said sampling having a predetermined sequence relative to the sample sequence of said time gated input signal.

4,117,410

PHASE LOCKED LOOP SIGNAL DEMODULATOR AND SQUELCH CIRCUIT

Steven Frank Bender, Burnsville, Minn., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 13, 1977, Ser. No. 841,611
Int. Cl.[2] H03D *3/18*
U.S. Cl. 329—50 **5 Claims**



1. In a demodulator for receiving a frequency modulated (FM) signal having a modulating signal with a predetermined range of frequencies, said demodulator including a phase locked loop having a phase comparator, a low pass filter and a DC amplifier connected in series in a forward path and a current controlled oscillator (CCO) connected between the DC amplifier and the phase comparator in a feedback path, said phase locked loop for locking to the FM signal and recovering the modulating signal, said demodulator including improvement comprising:

said CCO being configured as an emitter-coupled multivibrator having timing capacitor means and providing a first output signal;

output signal utilization means;

differential comparator means differentially coupled to the timing capacitor means of the CCO for providing a second output signal phase shifted by 90° from the first output signal of the CCO;

signal detecting means including a quadrature phase comparator, filter means, and amplifier means connected in series, the quadrature phase comparator multiplying the FM signal and the second output signal from the differential comparator means and providing a third output signal, the filter means filtering out substantially all frequencies from, and passing the DC component of, the third output signal of the quadrature phase comparator to provide a DC indication signal, the amplifier means providing a predetermined amplification to the DC indication signal; and

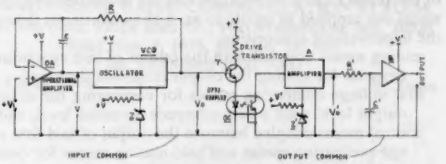
switching means coupled to the amplifier means for gating the recovered modulating signal from the phase locked loop to said output signal utilization means when the magnitude of the amplified DC indication signal is greater than a predetermined magnitude.

4,117,411

ISOLATION CIRCUIT WITH DUTY CYCLE FEEDBACK

William M. Goble, Perkasie, Pa., assignor to Moore Products Co., Spring House, Pa.

Filed Sep. 26, 1977, Ser. No. 836,661
Int. Cl.[2] H03F *3/38*
U.S. Cl. 330—10 **6 Claims**



1. An electric circuit for delivering an analog electric output signal proportional to and electrically isolated from an input analog voltage signal which comprises

voltage controlled square wave generator means having an output terminal and a first input terminal and which delivers a first square wave voltage at said output terminal whose ratio of ON time to total period is directly related to the voltage applied to said first input terminal,

said voltage controlled square wave generator means having a second input terminal,

first regulating means connected to said second input terminal for controlling the maximum and minimum values of said first square wave voltage,

comparator means connected to said output terminal of said square wave generator means and receiving the input analog voltage for determining the instantaneous difference between said input analog voltage and said first square wave voltage and generating a control voltage applied to said first input terminal of said square wave generator means which is proportional to the time integral of said difference,

coupling means connected to said output terminal of said square wave generator means for synchronously transmitting said first square wave voltage to an electrically isolated circuit,

said electrically isolated circuit comprising amplifier means having an output terminal and a first input terminal and which delivers at its said output terminal a second square wave voltage in synchronism with said first square wave voltage received at said first input terminal,

said amplifier means having a second input terminal,

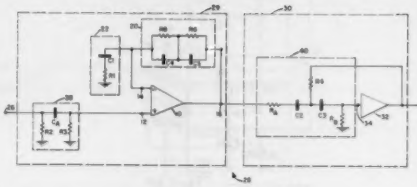
second regulating means connected to said second input terminal of said amplifier for controlling the maximum and minimum values of said second square wave voltage, and

averaging means for delivering an output signal of the average value of said regulated second square wave voltage.

4,117,412
PHONOGRAPH PREAMPLIFIER NETWORK WITH INFRASONIC CUTOFF RESPONSE

Tomlinson M. Holman, II, Cambridge, Mass., assignor to Advent Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 736,404, Oct. 28, 1976, Pat. No. 4,032,855. This application Jun. 27, 1977, Ser. No. 810,676
Int. Cl.[2] H03F *1/34*
U.S. Cl. 330—107 **10 Claims**



1. An audio signal preamplifier network having a preamplifier input terminal for coupling to a magnetic phonograph cartridge, and having a preamplifier output terminal, comprising a first stage including:

a first high gain amplifier having inverting and non-inverting input terminals and an output terminal, said input terminals being characterized by relatively high impedance, and said non-inverting amplifier input terminal being coupled to said preamplifier input terminal,

equalization feedback network coupled between said amplifier output terminal and said inverting terminal,

an RC filter network characterized by a single real axis pole and including a first resistor, **R1**, and first capacitor, **C1**, coupled in series between said inverting input terminal and a first reference potential, and

a second stage including:

an infrasonic filter network characterized by a pair of off-axis complex poles, and including a second amplifier having a relatively high input impedance non-inverting input terminal and having an output terminal coupled to said preamplifier output terminal, and further including second and third capacitors, **C2** and **C3**, respectively, coupled in series between said first amplifier output terminal and said second amplifier input terminal by way of an input resistor R_A, an output termination resistor R_B, coupled between said second amplifier input terminal and a second reference potential, and a feedback resistor, **R4**, coupled between said second amplifier output terminal and the junction between said second and third capacitors,

wherein said RC filter and said infrasonic filter networks are adapted to control the infrasonic frequency response of said preamplifier network whereby said preamplifier network is characterized by an 18 dB per octave roll-off response at frequencies below a predetermined infrasonic frequency and a relatively flat response at frequencies in a predetermined range adjoining and above said predetermined infrasonic frequency.

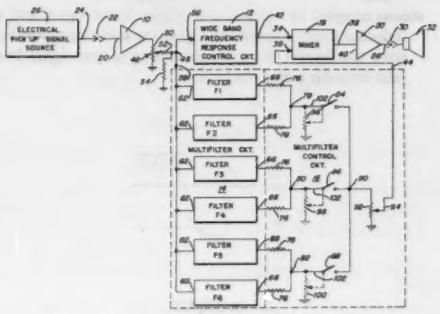
4,117,413
AMPLIFIER WITH MULTIFILTER

Robert A. Moog, East Aurora, N.Y., assignor to Norlin Music, Inc., Lincolnwood, Ill.

Filed Jun. 21, 1977, Ser. No. 808,494
Int. Cl.[2] H03F *3/68*
U.S. Cl. 330—126 **13 Claims**

1. In an audio amplifier for producing amplified signals on an output thereof corresponding to audio signals applied to an input thereof a multifilter circuit, comprising:

a plurality of resonant filters each having a resonant frequency in the upper portion of the audio frequency spectrum and a relatively narrow bandwidth, the resonant frequencies of each of the resonant filters being separated from each other by an amount substantially equal to a value between ½ and 1/6 octave for defining a gain versus frequency response characterized by a plurality of relatively narrow band alternate peaks and dips and a phase shift versus frequency response characterized by a plurality of relatively narrow band alternate peaks and dips, the Q's of the resonant filters being selected such that the peaks and dips of the gain versus frequency response exhibit a relatively large ratio;



means for connecting the plurality of resonant filters in parallel with one another between an input terminal and an output terminal thereof;

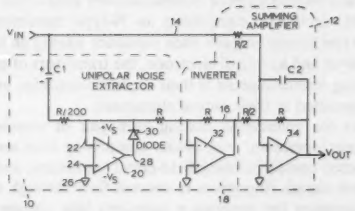
means connected with the input of the audio amplifier for applying the audio input signals to the input terminal, said plurality of resonant filters producing a filtered audio signal on the output terminal; and

means connected for applying the filtered audio signals to the audio amplifier output.

4,117,414
SIGNAL CONDITIONING CIRCUIT

John E. Lillig, Diamond Bar; Richard C. Meyer, La Habra, and Robert J. Anderson, Orange, all of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Jul. 5, 1977, Ser. No. 812,868
Int. Cl.[2] H03F *1/26*
U.S. Cl. 330—149 **1 Claim**



1. A signal conditioning circuit for extracting unipolar noise from an analog input signal comprising:

a coupling capacitor having an input terminal receiving said analog signal and an output terminal for supplying a signal corresponding to a unipolar noise component of said analog signal;

clamping means connected between said capacitor output terminal and a source of reference voltage for preventing said output terminal of said coupling capacitor from charging toward a voltage level representing an average value of said unipolar noise component, said clamping means including

an operational amplifier having inverting and noninverting input terminals and an output terminal, said nonin-

verting input terminal connected to the output terminal of said coupling capacitor and said inverting input terminal connected to a source of reference voltage, and

a diode connected in a feedback path between the output terminal of said operational amplifier and the inverting input terminal thereof, said diode oriented in a direction to be reverse biased by said unipolar noise component; and

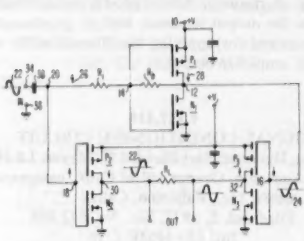
means coupled to receive said analog input signal and said unipolar noise component signal for subtracting the latter from the former to supply an analog output signal free of said unipolar noise component.

4,117,415

BRIDGE AMPLIFIERS EMPLOYING COMPLEMENTARY TRANSISTORS

Merle Vincent Hoover, Flemington, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 14, 1977, Ser. No. 787,701
Int. Cl.[2] H03F *3/18*
U.S. Cl. 330—264 **44 Claims**



1. A bridge amplifier comprising, in combination:

first and second pairs of complementary field-effect transistors, each pair comprising an N-type transistor and a P-type transistor, each such transistor having an input, an output and a control electrode, the transistors of each pair being interconnected at their control electrodes, and interconnected at their output electrodes;

means for quiescently biasing each pair of transistors for linear operation, said means comprising two series-connected complementary field-effect transistors, and a feedback circuit responsive to current flow through said two transistors for applying a quiescent bias voltage to said interconnected control electrodes of said first and second pairs of transistors;

two input circuits, one coupled between the control and input electrodes of one pair, and the other coupled between the control and input electrodes of the other pair;

two operating voltage terminals, one said terminal coupled to the input electrodes of the P-type transistors and the other said terminal coupled to the input electrodes of the N-type transistors;

a load circuit coupled between the output electrodes of one pair of transistors and the output electrodes of the other pair of transistors; and

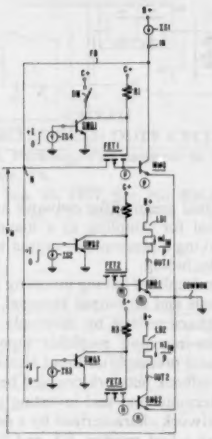
means coupled between said two input circuits for applying an input signal in one phase to one pair of transistors and in opposite phase to the other pair of transistors.

4,117,416

CURRENT MIRROR AMPLIFIERS WITH PROGRAMMABLE CURRENT GAINS

Otto Heinrich Schade, Jr., North Caldwell, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 28, 1977, Ser. No. 855,088
Int. Cl.[2] H03G *3/30;* H03F *3/04*
U.S. Cl. 330—282 **10 Claims**



1. A current mirror amplifier with programmable current gain comprising:

master and slave mirroring transistors of the same conductivity type and with like current gain characteristics each having respective first and second electrodes and a respective controlled conduction path therebetween and having a respective third or control electrode, the conduction of said controlled conduction path being controlled in direct response to the potential between said second and third electrodes;

an input terminal to which the first electrode of said master transistor is connected;

an output terminal to which the first electrode of said slave transistor is connected;

a common terminal to which the second electrodes of said master and slave transistors are connected;

a node to which said input terminal is direct coupled;

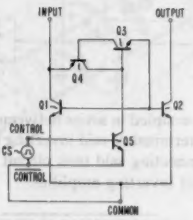
a first transmission gate for providing selective connection of said node to the third electrode of said slave mirroring transistor responsive to the selective application thereto of a first level of control signal, the current to the third electrode of said slave mirroring transistor during said selective connection developing a potential drop across the resistance of the transmissive first transmission gate; and

means providing a resistance between said node and the third electrode of said master mirroring transistor at least whenever said selective connection is established, which resistance is of such value that the current to the third electrode of said master mirroring transistor causes a potential drop thereacross substantially equal to the potential drop across the resistance of the transmissive first transmission gate, for compensating against the effects of that potential drop on the programmable current gain.

4,117,417
SWITCHABLE CURRENT AMPLIFIERS

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Sep. 6, 1977, Ser. No. 830,859
Int. Cl.[2] H03F 3/04
U.S. Cl. 330—288 **7 Claims**



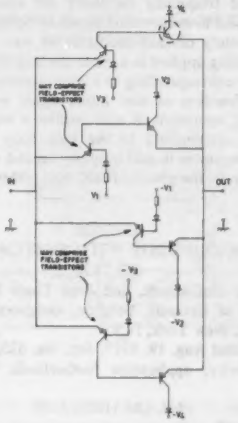
1. A switchable current amplifier comprising:
input, output and common terminals;
first, second and third transistors of a first conductivity type and a fourth transistor of a second conductivity type complementary to said first conductivity type, each having respective base and emitter and collector electrodes;
connections of the collector electrodes of said first and said second transistors respectively to said input terminal and to said output terminal;
connections of the emitter electrodes of said first and said second transistors to said common terminal;
means connecting said third and said fourth transistors as a latch circuit between said input terminal and an interconnection between the base electrodes of said first and said second transistors, which latch circuit when latched completes the connection of said first and said second transistors in a current mirror amplifier configuration, said means including:
a connection of the emitter electrode of said third transistor to said interconnection between the base electrodes of said first and said second transistors, a connection of the collector electrode of said third transistor to the base electrode of said fourth transistor, a connection of the collector electrode of said fourth transistor to the base electrode of said third transistor, and a connection of said input terminal to the emitter electrode of said fourth transistor; and
disabling means for selectively diverting collector current of said fourth transistor from being applied to the base electrode of said third transistor.

4,117,418
ELECTRIC AMPLIFIER

Lennart Harry Erik Höglund, S-163 60 Spanga, Lindalsvagen 5, Sweden

Filed Jan. 14, 1977, Ser. No. 759,480
Int. Cl.[2] H03F 3/04, 3/68
U.S. Cl. 330—296 **17 Claims**

1. An electric amplifier, comprising several partial amplifiers, which are so connected and voltage fed that each of them amplifies a voltage interval of an input voltage, whereby each partial amplifier has its inlets at one side and its outlets at the other side coupled together and connected to a common inlet or outlet respectively, and wherein every partial amplifier comprises at least one amplification component (**1**; T_3 T_4) and two gates, of which one (**2, 3, 4**; T_1 D_1 R_1; P_2 D_{11} R_1) is blocking those potentials applied to the component that are less than a given first value (V_1 U_{TN} U_{11}) but is open for potentials exceeding said value while the other (**5**; T_2 D_2 R_2; P_1 D_{u1} R_1) is open for potentials that are less than a given second value (V_2 U_{BN} U_{u1}) greater than said first value but is blocking the component for potentials exceeding said second value (V_2 U_{BN} U_{u1}) wherein said gate (**2, 3, 4**; T_1 D_1 R_1 P_2 D_{11} R_1) for blocking potentials less than the first value (V_1 U_{TN} U_{11}) comprises an active element, connected to the input voltage and to the lower limiting voltage (V_1 U_{TN} U_{11}), by a series connection of a diode

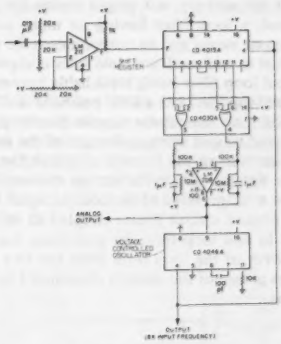


(D_1 D_{11}) and a resistance (R_1), and also being connected to an electrode in the amplifier element (**1**; T_3 T_4) of the partial amplifier.

4,117,419
FREQUENCY MEASURING SYSTEM EMPLOYING AN AUTO-CORRELATION FUNCTION FREQUENCY CONTROL LOOP

Michael Jefferson Rudd, Concord, Mass., assignor to Bolt Beranek and Newman Inc., Cambridge, Mass.

Filed Jul. 7, 1977, Ser. No. 813,507
Int. Cl.[2] H03B 3/04
U.S. Cl. 331—1 A **17 Claims**



1. Apparatus for determining the frequency of a signal component in a single composite input signal, said apparatus comprising:
means for generating a binary input signal having transitions which correspond to zero crossings in said composite input signal;
shift register means having a plurality of stages which may be clocked at a selectable frequency;
means for entering said binary input signal into said shift register thereby to obtain from said shift register a delayed version of said binary input signal;
means for correlating said input signal with the delayed

version thereof so as to obtain a coincidence signal which is dependent upon the value of the delay;

means for filtering said coincidence signal to obtain an average correlation value signal;

a controlled frequency oscillator for clocking said shift register, said average value signal being applied to control the frequency of said oscillator to vary said delay, the control being applied in a sense tending to adjust the delay to a value corresponding to a zero crossing in the autocorrelation function of said input signal whereby the frequency of operation of said oscillator will automatically adjust to correspond to the frequency of a consistent signal component in said input signal and will be relatively insensitive to the phase of said component.

4,117,420

PHASE-LOCKED LOOP WITH SWITCHABLE LOOP FILTER

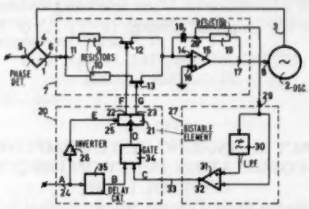
Wilfried Rene' DeConinck, and Jean Louis Ernest Raymond Goret, both of Brussels, Belgium, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 19, 1977, Ser. No. 825,962

Claims priority, application Netherlands, Aug. 20, 1976, 7609251

Int. Cl.[2] H03B *3/04*

U.S. Cl. 331—17 **4 Claims**



1. A phase-locked loop, comprising an oscillator means for supplying an oscillator signal having a frequency to be varied in dependence upon a control signal, a phase detector having two input means for receiving the oscillator signal and a reference signal respectively and output means for generating an output signal, a loop filter having an input coupled to said detector output means and an output means for supplying said control signal to said oscillator, said filter comprising a storage element, said loop filter being switchable between a first state in which the loop filter has a wide passband and a second state in which the loop filter has a narrow passband, arrangement means coupled to said storage element of the switchable loop filter for determining the instants at which the instantaneous value of the signal stored in the storage element is substantially equal to the average value of the control signal for the oscillator, and a control circuit means coupled to said arrangement means and to said loop filter for providing that after locking switching-over of the loop filter from the first to the second state occurs at one of the instants determined by said arrangement means.

4,117,421

CRYSTAL OSCILLATOR WITH REDUCED POWER CONSUMPTION

Leo Wiesner, Kew Gardens, N.Y., assignor to Timex Corporation, Waterbury, Conn.

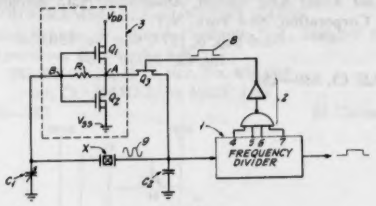
Filed Jul. 29, 1977, Ser. No. 820,478

Int. Cl.[2] H03B *5/36*

U.S. Cl. 331—116 R **3 Claims**

1. In combination:

an oscillator means for providing an output signal comprising a tank circuit having a piezoelectric crystal vibrator connected across two series capacitances with a grounded connection between the two capacitances, and an inverting amplifier having an input and output terminal connected to said tank circuit to provide a regenerative feedback signal thereto;



switch means coupled in series between said tank circuit and the output terminal of said inverting amplifier for periodically disconnecting said tank circuit from the output terminal of said inverting amplifier.

4,117,422

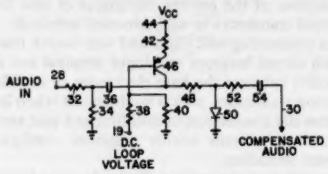
CIRCUIT FOR COMPENSATING VCO NONLINEARITIES IN FREQUENCY MODULATED PHASE-LOCKED LOOPS AND METHOD THEREOF

Albert Henry Hunt, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 27, 1977, Ser. No. 865,043

Int. Cl.[2] H03C *3/08*

U.S. Cl. 331—18 **9 Claims**



1. An audio frequency compensation circuit for use in a frequency modulated phase-locked loop comprising:

(a) first conversion means for converting a DC error voltage in the phase-locked loop to a first current;

(b) second conversion means for converting an audio frequency signal to a second current;

(c) diode means for converting a sum of said first current and said second current to a modulating voltage for frequency modulating the phase-locked loop.

4,117,423

DUAL MODE MULTIPHASE POWER DIVIDER

Harold A. Rosen, Santa Monica, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Sep. 23, 1976, Ser. No. 726,078

Int. Cl.[2] H01P *5/12, 1/18*

U.S. Cl. 333—9 **4 Claims**

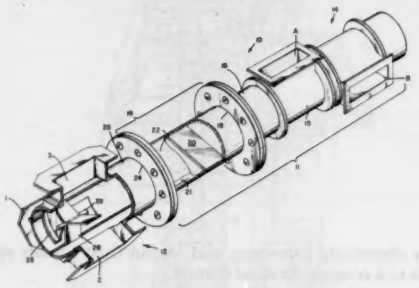
1. A dual mode multiphase power divider, comprising:

input means for receiving at least first and second circularly polarized waves having at least first and second senses;

waveguide means coupled to said input means for propagating all said waves along said waveguide means from a first end to a second end; and

N output ports equally spaced about said waveguide means for providing N output signals having a first phase progression in response to said first input wave and providing N output signals having a second phase progression in response to said second input wave, said N output ports being at least 3 and N being an odd integer, said N output

ports being mounted at 360/N° about said waveguide means for providing 1/N of the output power from each



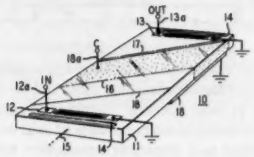
of said output ports in response to each of said first and second circularly polarized signals.

4,117,424

ACOUSTIC WAVE DEVICES

Larry Allen Coldren, Holmdel; Alastair Malcolm Glass, Millington, and Ross Alan Lemons, Tinton Falls, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 30, 1977, Ser. No. 783,056
Int. Cl.[2] H03H *9/30, 9/04, 9/26;* **H04R** *17/10*
U.S. Cl. 333—30 R **18 Claims**



1. An acoustic wave device comprising

a monolithic body of a crystalline material in which acoustic waves will propagate, said body including first and second regions which have differing crystal axis orientations and which interface at a planar domain wall,

first transducing means disposed on said body and operative in response to an input signal for launching acoustic waves along a path which intersects said domain wall,

second transducing means disposed on said body such that it receives at least a portion of the energy of said acoustic waves, said second transducing means providing an output signal in response to said received portion, and

means responsive to a control signal for varying the location of said domain wall within said body,

said control means including a pair of electrodes disposed on opposing surfaces of said body such that they intersect the plane of said domain wall and means for applying said control signal to said electrodes,

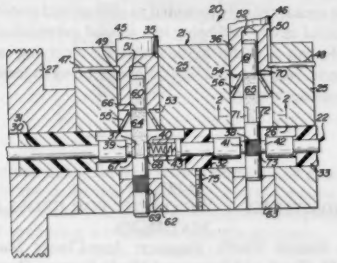
at least one of said electrodes comprising a plurality of regions of alternating high and low impedance and said control signal applying means including means for applying first and second signals to a selected pair of said low impedance regions.

4,117,425

MICROWAVE STEP ATTENUATOR

Helmut Bacher, 771 Quince Orchard #11, Gaithersburg, Md. 20760

Filed Jan. 31, 1977, Ser. No. 763,824
Int. Cl.[2] H01P *1/22*
U.S. Cl. 333—81 A **10 Claims**



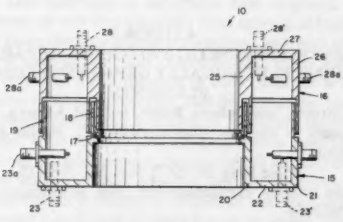
1. A microwave attenuator comprising an inner conductor having a gap, an outer conductor extending along and cooperating with said inner conductor to define therealong a microwave transmission path, and attenuator means extending between said inner and outer conductor, said attenuator means comprising an elongate dielectric extension member transversely of and mounted in said outer conductor for shifting movement in said outer conductor transversely thereof and extending shiftably through said gap in bridging relation with the latter, a specifically configured resistive element carried by said extension member for movement therewith between an attenuating position electrically connecting said inner and outer conductors and an alternate position not electrically connecting said inner and outer conductors, and an additional conductor carried by said extension member for movement into said gap to electrically close the latter in said not electrically connecting position for zero attenuation, said extension member, resistive element and additional conductor being substantially aligned transversely of said inner and outer conductors.

4,117,426

MULTIPLE CHANNEL ROTARY JOINT

Thomas Hudspeth, Malibu, and Harold A. Rosen, Santa Monica, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 30, 1976, Ser. No. 755,701
Int. Cl.[2] H01P *1/06, 1/16, 5/08*
U.S. Cl. 333—98 TN **13 Claims**



1. A multiple channel rotary joint for transferring microwave energy from a stationary member to a rotating member, said microwave energy having a predetermined frequency and wavelength, comprising:

a toroidal cavity having first and second portions rotatable on each other for propagating a plurality of selected mi-

crowave modes, said toroidal cavity having an axial passageway, said cavity having predetermined dimensions for causing a TEM mode and two selected TE modes to propagate therein and for causing TM modes to be attenuated;

input means radially mounted to said first portion of said toroidal cavity and being in a first perpendicular plane to the axis of said toroidal cavity for propagating said modes therein; and

output means radially mounted to said second portion of said toroidal cavity and being in a second perpendicular plane to the axis of said toroidal cavity for receiving said modes therein, said first and second planes being at least one-half wavelength apart.

4,117,427

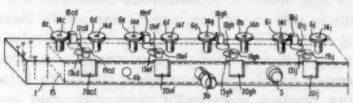
STANDARDIZED COMPONENT FOR CROSS-POINT MATRICES

Camille Gabriel Krafft, Bagneux; Jean-Claude Simonet, La Celle St. Cloud, and Emmanuel Marie Jammes, Orvault, all of France, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Sep. 27, 1976, Ser. No. 727,115

Int. Cl.[2] H01H *67/14*

U.S. Cl. 335—112 **3 Claims**



1. A standardized component support for coil-operated cross-points for use in a switching matrix comprising:

a rectangular strip made of electrically insulating material having complementary assembly means on the sides of the strip to provide rigid assembly of each component with other substantially identical components into a plane matrix, said means containing at least one locating element on one side and a plurality of complementary elements on the other side to ensure the correct relative positioning of the components when assembled into a matrix; and

a series of identical hollow cylindrical appendages located on the top surface of the components to provide coil formers for a plurality of corresponding cross-point control coils carried by the component.

4,117,428

ELECTRO-MAGNETIC SWITCHING APPARATUS HAVING ELECTRICALLY SEPARATED CONTACT ELEMENTS

Georg Streich, and Johann Bauer, both of Amberg, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

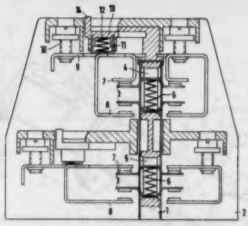
Filed May 10, 1977, Ser. No. 795,515

Claims priority, application Fed. Rep. of Germany, May 18, 1976, 2622054

Int. Cl.[2] H01H *67/02*

U.S. Cl. 335—132 **9 Claims**

1. In an electromagnetic switching apparatus including a housing, a plurality of movable contact bridges mounted on a contact bridge carrier, first fixed contact elements which extend around one end of said contact bridges and are coupled to terminal elements for said first fixed contact elements, and electrically-separated second fixed contact elements disposed at the other end of said contact bridges on both sides of said contact bridges, the improvement comprising means for selec-



tively electrically connecting said second fixed contact elements to a common terminal element.

4,117,429

ELECTROMAGNETIC SWITCHING APPARATUS

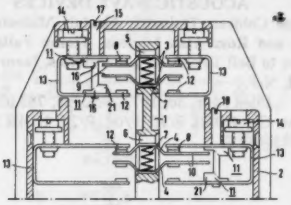
Georg Streich, and Johann Bauer, both of Amberg, Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed May 10, 1977, Ser. No. 795,495

Claims priority, application Fed. Rep. of Germany, May 18, 1976, 2622100

Int. Cl.[2] H01H *67/02*

U.S. Cl. 335—132 **8 Claims**



1. In an electromagnetic switching apparatus including a housing, movable contact elements mounted on a plurality of contact bridges in said housing, electrically-connected fixed contact elements disposed on both sides of said contact bridges adapted for contact and electrical connection with said movable contacts and said contact bridges, and electrical insulation means for interrupting the electrical connection between said fixed contact elements and said contact bridges in two terminal positions of said contact bridge carrier, the improvement comprising at least one end of said contact bridges extending outwardly beyond the area of contact between said movable contacts and said fixed contacts, said electrical insulation means being movably supported in said housing so as to be operatively engageable in at least one position with said extended ends of said contact bridges for interrupting the electrical connection between at least one of said contact bridges and said fixed contact elements.

4,117,430

KEYBOARD SWITCH

Dewey M. Sims, Jr., Wayne, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Mar. 14, 1977, Ser. No. 777,401

Int. Cl.[2] H01H *51/28*

U.S. Cl. 335—205 **12 Claims**

1. A keyboard switch comprising:

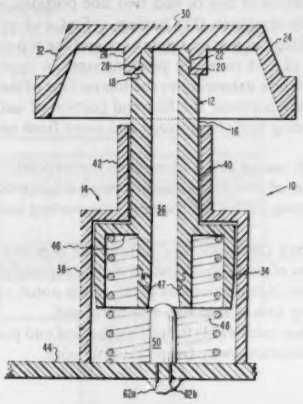
a switch housing defined by a hollow body having an external aperture in communication with the hollow portion of said body;

a base surface supporting said switch housing;

a plunger defined by an integral shaft formed of a magne-

tized, plastic material and disposed for reciprocal motion within said aperture;

biasing means for urging said plunger toward a rest position distal from said base surface; and



magnetic sensing means, responsive to a change in magnetic field intensity, for sensing the travel of the plunger from the rest position toward said base surface and producing a signal representative thereof.

4,117,431

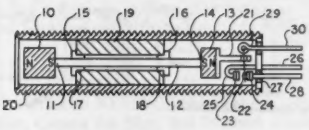
MAGNETIC PROXIMITY DEVICE

Robert L. Eicher, Louisville, Ky., assignor to General Equipment & Manufacturing Co., Inc., Louisville, Ky.

Filed Jun. 13, 1977, Ser. No. 805,696

Int. Cl.[2] H01H *36/00*

U.S. Cl. 335—207 **6 Claims**



1. In a device for sensing the presence of a magnetizable operator, in combination, a housing, a first permanent magnet, a second permanent magnet, non-magnetic means coupling said magnets in spaced apart position, means in the housing for guiding said magnets and coupling means for movement generally along the line of centers of the magnets, a magnetizable member interposed between said magnets and dimensioned to leave a first air gap between the member and the first magnet and a second air gap between the member and the second magnet, and utilization means responsive to the position of the magnets relative to the housing, said air gaps and magnets being arranged that the magnets are shifted from one side of an equilibrium position to the other side thereof by the presence of a magnetizable operator adjacent the first magnet.

4,117,432

DEFLECTION YOKE WITH UNITARY COIL FRAME

Kazunori Shizu, Yokohama, Japan, assignor to Denki Onkyo Co., Ltd., Tokyo, Japan

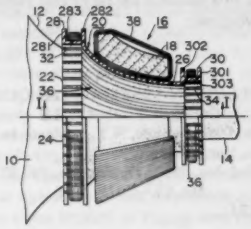
Filed Jan. 19, 1976, Ser. No. 650,130

Claims priority, application Japan, Jan. 17, 1975, 50-8150

Int. Cl.[2] H01F *7/00*

U.S. Cl. 335—210 **11 Claims**

1. A deflection yoke including a core and a pair of horizontal and vertical deflection coils, comprising a sleeve-shaped coil frame including a flare-shaped body and a pair of end formations integrally formed at its front and rear ends thereby forming a single unitary frame member, each of the front and rear



end formations being formed with a plurality of grooves, at least one of the deflection coils being directly wound on the inner surface of the coil frame in a saddle configuration by fitting and anchoring a conductor into the grooves.

4,117,433

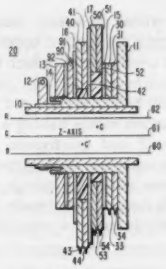
STATIC CONVERGENCE DEVICE INCLUDING MAGNETIC CORRECTOR APPARATUS

Joseph Leland Smith, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 25, 1977, Ser. No. 790,198

Int. Cl.[2] H01F *7/00*

U.S. Cl. 335—212 **6 Claims**



1. Static convergence apparatus for statically converging three electron beams within an envelope of a cathode ray tube, said electron beams subject to various conditions of misconvergence, comprising:

adjustable first magnetic convergence means suitable for locating about a portion of said envelope for producing within said envelope an adjustable first magnetic field, adjustment of said first magnetic field moving at least two of said three electron beams in directions and with magnitudes of motion that will converge said three electron beams to within a first distance of each other for selected conditions of misconvergence, said first magnetic convergence means producing a motion of minimum magnitude of at least a first one of said electron beams relative to a second one of said electron beams for all adjustments of said first magnetic field, wherein said first magnetic convergence means is unable to converge said first one and said second one of said electron beams to within said first distance for all of said various conditions of misconvergence; and

adjustable magnetic corrector means suitable for locating about a portion of said envelope for producing a second magnetic field of fixed magnetic field strength and adjustable direction for effecting motion of a substantially fixed magnitude of said first one of said electron beams relative to said second one of said electron beams in a direction

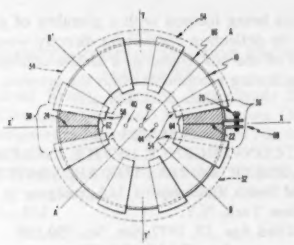
that will offset said motion of minimum magnitude produced by said first magnetic convergence means for enabling said first magnetic convergence means to converge said first one and second one of said electron beams to within said first distance for all of said various conditions of misconvergence.

4,117,434

HYBRID DEFLECTION SYSTEM WITH QUADRIPOLAR CORRECTION COILS

James H. Logan, Baldwinsville, N.Y., assignor to General Electric Company, Portsmouth, Va.

Filed Jan. 19, 1977, Ser. No. 760,572
Int. Cl.² H01F *5/02*
U.S. Cl. 335—213 **15 Claims**



1. A deflection system for use with a cathode ray tube comprising:

horizontal and vertical deflection means including a split ring magnetic core having two breaks therein and further including a coil configuration which results in at least two limited areas having no windings on said core at which limited areas said breaks are located; and

quadripolar correction means having a plurality of coils, at least a portion of said quadripolar coils covering said limited areas on said core, each of two of said quadripolar coils having areas void of windings with each void area coincident with one of said breaks in said core and of sufficient magnitude to allow assembly of said core.

4,117,435

FLAP-ARMATURE ELECTROMAGNET

Yukio Hishida; Yuichi Asai; Toshikatsu Kondo; Akira Asai, all of Nagoya; Atsuo Sakaida, Gifu, and Chiaki Miyazawa, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed May 31, 1977, Ser. No. 801,999
Claims priority, application Japan, Jun. 14, 1976, 51-77287[U]
Int. Cl.² H01F *7/08*
U.S. Cl. 335—270 **4 Claims**

1. A flap-armature electromagnet comprising

(a) a U-shaped yoke (**16**) having a bottom portion and two side portions;

(b) a pole core (**15**) secured to the bottom portion of said U-shaped yoke;

(c) a coil (**14**) wound on said pole core (**15**);

(d) projecting means defining a rocking axis provided at the top surface of one of said two side portions;

(e) a flap-armature (**17**) having a first end portion (**17*b***) extending beyond said pole core and the top surface of the other of said two side portions, and an opposite second end portion extending to the top surface of the one of said two side portions, the first end portion of said flap-armature being movable toward and away from said pole core (**15**);

(f) notch means (**17*a***) formed at the opposite second end portion of said flap-armature being engageable with said projecting means for rockingly supporting said flap-armature;

(g) a spring (**25**) positioned to hold the opposite second end portion of said flap-armature on the top surface of one of said two side portions by pressing the notch means on the rocking axis of said flap-armature; and,

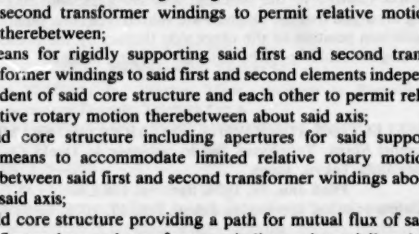
(h) resilient means (**24**) for urging the first end portion of said flap-armature away from said pole core.

4,117,436

TORQUELESS RELATIVELY MOVING TRANSFORMER WINDINGS

Alexander G. MacLennan, Harvard, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed Aug. 23, 1976, Ser. No. 716,707
Int. Cl.² H01F *15/02*
U.S. Cl. 336—65 **7 Claims**



1. A transformer providing low restraint limited motion between transformer windings comprising:

first and second transformer windings having a common axis;

first and second elements;

a core structure of high permeability material surrounding and passing through said first and second windings to provide a high permeability flux circuit substantially free of low permeability gaps for mutual flux between said first and second transformer windings;

said core structure being configured to contain said first and second transformer windings to permit relative motion therebetween;

means for rigidly supporting said first and second transformer windings to said first and second elements independent of said core structure and each other to permit relative rotary motion therebetween about said axis;

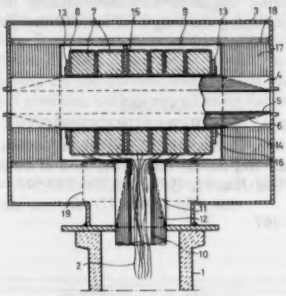
said core structure including apertures for said support means to accommodate limited relative rotary motion between said first and second transformer windings about said axis;

said core structure providing a path for mutual flux of said first and second transformer windings substantially without air gaps therein without providing a low reluctance path to leakage flux.

4,117,437
TOP CORE TYPE CURRENT TRANSFORMER STRUCTURE

Otto Ottesen, Ludvika, Sweden, assignor to ASEA Aktiebolag, Vasteras, Sweden

Filed Jun. 27, 1977, Ser. No. 810,165
Claims priority, application Sweden, Jul. 2, 1976, 76075852
Int. Cl.[2] H01F *40/06*
U.S. Cl. 336—69 **9 Claims**



1. Current transformer for high voltage application, comprising:

a column of insulating material supporting a metal housing including an insulating body through which the primary conductor of the transformer passes;

a plurality of cores each including a secondary winding of the transformer and being enclosed in a grounded metal core casing extends around the central portion of said insulating body to form annular regions between said metal core casing and said metal housing;

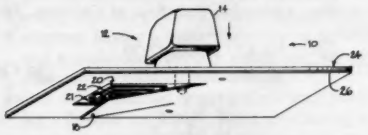
said annular regions lying in the axial extension of said metal casing; and

insulated metal rings provided in said annular regions for achieving a uniform voltage distribution in said annular regions between said core casing and said housing.

4,117,438
CONTACTLESS KEYSWITCH FOR KEYBOARDS

Kirk J. Kim, Corona del Mar, and Michael Muller, Newport Beach, both of Calif., assignors to Datanetics Corporation, Fountain Valley, Calif.

Filed Apr. 13, 1977, Ser. No. 786,983
Int. Cl.[2] H01F *21/04;* **G08C** *1/00*
U.S. Cl. 336—75 **12 Claims**



1. A contactless keyswitch comprising:

a circuit board having at least one reactive circuit element formed thereon; a sheet of material secured to said circuit board, said sheet including at least one movable, electrically conductive flap formed integrally therein, said flap being disposed opposite said circuit element and biased toward the circuit element; and keyswitch actuating means coupled to said flap to move the flap away from the circuit element to cause a change in reactance of said circuit element upon actuation of said switch.

9. A keyboard comprising:

a circuit board;

a plurality of keyswitch actuating means disposed on one side of said board, said actuating means including keys and keystems located to pass through corresponding apertures in said board upon actuation thereof;

a plurality of circuit elements formed on the opposite side of said board, and a strip of resilient material secured to said opposite side and over said circuit elements;

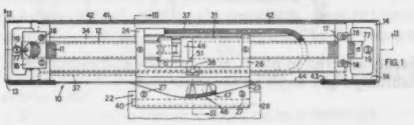
said strip of material including partially severed areas forming a plurality of flaps, said flaps being located opposite respective ones of said circuit elements, said flaps being hinged along unsevered portions integral with said strip and resiliently biased by said portions against respective circuit elements;

said flaps including electrically conductive material for changing the reactance of opposing circuit elements in response to operation of said keyswitch actuating means having keystems located to engage and move respective ones of said flaps.

4,117,439
TRANSDUCER FOR MEASURING LINEAR POSITIONS

Nino Azzani, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Apr. 4, 1977, Ser. No. 784,429
Claims priority, application Italy, Apr. 8, 1976, 67821 A/76
Int. Cl.[2] H01F *21/04*
U.S. Cl. 336—129 **5 Claims**



1. A transducer for measuring linear positions, comprising a scale constituted by a tensioned flexible band bearing a first electric winding, a slide movable with respect to the scale and bearing a second winding, a guide plate fast with the slide, parallel to the second winding and extending over the whole area of the second winding, and pressure means arranged to keep the band in close contact with the plate.

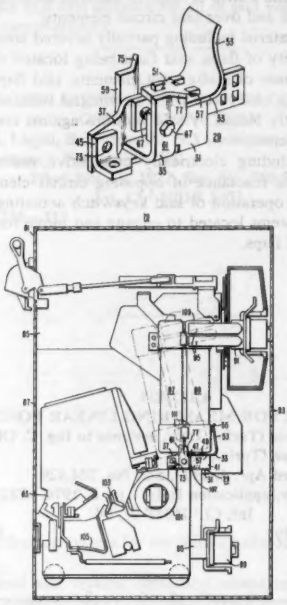
4,117,440
FUSE MOUNT FOR SWITCHING APPARATUS

Thomas A. Wilsdon, Alden; William P. Heim, Cheektowaga, and Glenn A. Barlis, Fairport, all of N.Y., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 19, 1977, Ser. No. 760,488
Int. Cl.[2] H01H *85/50, 85/60*
U.S. Cl. 337—213 **7 Claims**

1. In a circuit interrupter having cooperable switch members including a stationary contact and a movable elongated tubular fuse, and wherein one end of the fuse is swingable about the other end of the fuse in a predetermined path rearward and forward respectively toward and from the stationary contact to respectively close and open a circuit between the stationary contact and the one end of the fuse, the fuse having a peripheral surface extending longitudinally of the fuse, support means for pivotably supporting the other end of the fuse comprising clamping means for clamping the peripheral surface and including peripherally spaced members, one of which members

is a flexible member having one end yieldingly urging the fuse against the other of the members and having another end



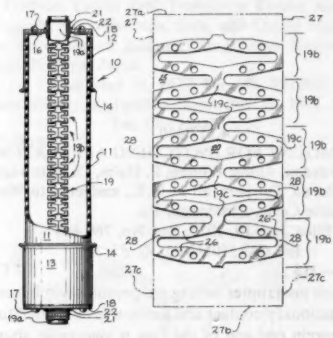
fixedly secured in place, and said one end extending at a substantially right angle to the other end.

4,117,441

CURRENT LIMITING FUSE CONSTRUCTION AND METHOD

Daniel A. Wycklendt, Milwaukee, Wis., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Apr. 15, 1977, Ser. No. 787,874
Int. Cl.² H01H *85/08*
U.S. Cl. 337—295 **6 Claims**



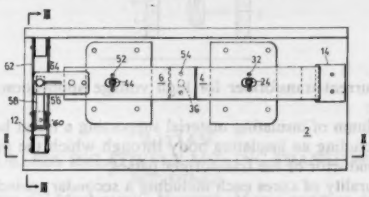
1. A current limiting fuse comprising a hollow casing of insulating material, conductive terminal elements carried by said casing, and a self-standing tubular fuse element of fusible material disposed axially of said casing and connected between said terminal elements, a plurality of axially spaced, generally diamond-shaped perforations formed through said fuse element with their major axes disposed in spaced planes substantially perpendicular to the axis of said fuse element, said perforations being axially distributed in succession and spaced apart circumferentially of said fuse element to define a plurality of axially spaced generally ring-shaped portions distributed substantially from one end of said fuse element to the other, each said ring-shaped portion providing a pair of substantially parallel arcuate current paths extending substantially fully around said fuse element for increasing the conductive path transversely of said fuse element, interconnections disposed between successive ones of said ring-shaped portions, said interconnections being displaced circumferentially of said fuse element for increasing the length of the current path via said element to develop a high arc voltage.

4,117,442

DIFFERENTIAL-TEMPERATURE-SENSITIVE DEVICE

Benjamin Bar-On, 15 Hacarmel St., Rishon Lezion, and Eldad Paz, 9 Haysar St., Ramat Hasharon, both of Israel

Filed Jan. 31, 1977, Ser. No. 763,915
Int. Cl.² H01H *37/46*
U.S. Cl. 337—397 **10 Claims**



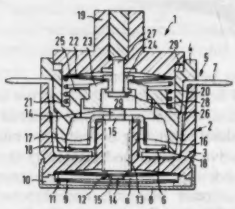
1. A differential-temperature sensitive device comprising: a base member; a first lever arm pivotably mounted at one end to said base member; a second lever arm pivotably mounted at one end to the opposite end of the first arm; a first temperature-sensitive element coupled to said first arm to pivot same with respect to the base member in response to the temperature sensed thereby; a second temperature-sensitive element coupled to said second arm to pivot same with respect to said opposite end of the first arm in response to the temperature sensed thereby; and a controlled member fixed to said base member and actuated by said opposite end of said second arm.

4,117,443

ELECTRIC TEMPERATURE PROTECTION SWITCH

Peter Höfsass, Strietweg 45, D-7530 Pforzheim, Fed. Rep. of Germany

Filed Jun. 6, 1977, Ser. No. 803,841
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1976, 2625120
Int. Cl.² H01H *37/70*
U.S. Cl. 337—348 **26 Claims**



1. Electric temperature protection switch with at least two encapsulated contacts in a housing and a current transmission member controlled by a temperature sensor, which transmission member in the on position is in spring-loaded application on the contacts, and is fixed in the off position, and with a

manual device biased by the force of a reset spring for switching on the released switch again; said switch comprising:

a first distance snap element directly connected with the current transmission member for holding the current transmission member in its respective off and on positions,

a switch plunger disposed at a distance from the current transmission member corresponding maximally to the switching stroke of the manual device and guided slidably on the housing,

a second snap element cooperating with the switch plunger and the manual device which is moved into a passive position from an active position as the result of actuation of the said manual device at critical temperatures, for switching on the current transmission member that is in the off position, with greater setting force with respect to that of the first snap element,

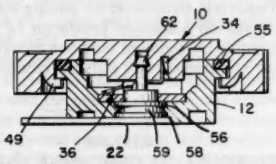
and a stop fixed on the housing for the switch plunger for resetting the second snap element from the passive to the active position, with springing back of the spring-loaded manual device.

4,117,444

HEARING AID VOLUME CONTROL

Bradrick Alan Hildreth, Covina, and Donald Harrison Stephens, Running Springs, both of Calif., assignors to Bourns, Inc., Riverside, Calif.

Filed Jul. 14, 1977, Ser. No. 815,877
Int. Cl.[2] H01C *10/50*
U.S. Cl. 338—198 **7 Claims**



1. A variable resistance device comprising:

a hollow body portion having a sealing ledge;

a post situated in said hollow body portion having a chevron at one end thereof and an intermediate ring portion that provides an annular bead retaining recess;

a sealing member to fit about said sealing ledge;

a substrate having a central aperture to fit about said post and a positioning keyway notch and having an arcuate resistance element formed thereon;

switch means retained in said hollow body portion comprising a flexible, resilient, metallic strip having a first switch contact area and a first switch terminal, and a metallic blade spring having a second switch contact area and a second switch terminal and having first and second positive-feel detents;

wiper spring means for wiping said arcuate resistance element;

a control cap having a sealing surface that fits over said sealing ledge thereby compressing said sealing member so as to form an airtight seal;

means for constraining said sealing surface to fit over said sealing ledge;

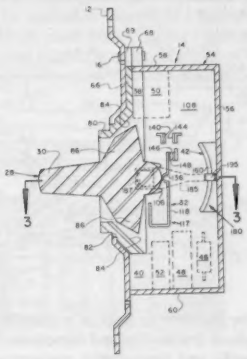
a switch actuating cam formed integrally with said control cap and rotatable therewith so as to actuate said switch means and to position said wiper spring means.

4,117,445

POWER REGULATOR

Luther M. Foreman; Samuel C. Heck, both of San Antonio, and Bill R. Wall, Bulverde, all of Tex., assignors to National Electric Corporation, San Antonio, Tex.

Filed May 16, 1977, Ser. No. 796,857
Int. Cl.[2] H01C *10/50*
U.S. Cl. 338—198 **27 Claims**



1. In a power regulator of the type having a non-conductive housing and a pivotal toggle member for varying the power supply to a load as the toggle member is displaced between opposite on-off limit positions, the improvement comprising:

a substrate secured within said housing and mounting selected components of a control circuit;

a switch operable by the toggle member to shunt or open the control circuit as the toggle is displaced to the respective on-off limit positions;

a potentiometer forming a part of said control circuit and comprising:

a first continuous resistive track on said substrate;

a second continuous conductive track on the opposite face of said substrate from said first track, said second track defining a path substantially identical to the path of said first track and being separated therefrom by a thickness of said substrate;

said first and second tracks defining arcuate paths formed proximate a correspondingly shaped marginal edge portion of the substrate;

contactor means having a pair of confronting inwardly biased contact elements for frictionally engaging each of said first and second tracks, said contactor means being movable by displacement of the toggle member such that said contact elements wipingly engage the tracks along their respective paths as the toggle member is displaced between said on-off limit positions.

4,117,446

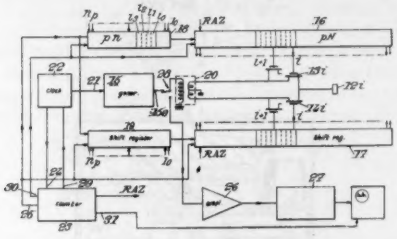
DEVICES FOR PROBING BY ULTRASONIC RADIATION

Pierre M. Alais, Dampierre, France, assignor to Agence Nationale de Valorisation de la Recherche (A N V A R), Neuilly sur Seine, France

Continuation-in-part of Ser. No. 629,599, Nov. 6, 1975. This application Jun. 20, 1977, Ser. No. 807,921
Claims priority, application France, Jun. 18, 1976, 76 18640
Int. Cl.[2] G01N *29/04*
U.S. Cl. 340—1 R **9 Claims**

1. A device for ultrasonic imaging with electronic scanning, having an array of N identical elementary transducers distributed at equal intervals along a scanning direction and operating at frequency *f*; a signal generator for generating electrical signals; a signal receiver for receiving and processing electrical signals; means for storing an electrical phase distribution signal representative of the phase distribution of *n* signals associated

with n adjacent transducers of said array, n being an integer greater than 1 and less than N, each said signal having a frequency f and having any one of m phases with respect to the remaining said n signals (m being an integer less than n), said electrical phase distribution signal being determined so that said n adjacent transducers focus energy at a point located at a predetermined distance from said array of transducers; switch means for simultaneously and temporarily connecting said



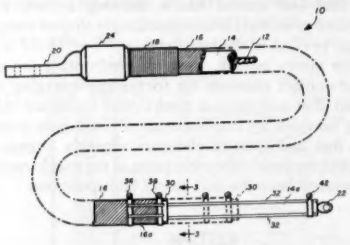
generator or receiver to a set of n transducers in accordance with said phase distribution and subsequently or previously for simultaneously and temporarily connecting said receiver or generator to those n' transducers among the n transducers which are closest to said point to said receiver; and sequencing means for causing said switch means to connect said generator and receiver, successively to sets of n and n' transducers which are each time shifted by at least one said transducer such that scanning occurs throughout said array.

4,117,447

BOUYANT ELECTRODE WITH ANTI-BIRDNESTING DEVICE

Paul F. Gould, Panama City, and James O. Pate, West Bay, both of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 29, 1977, Ser. No. 828,714
Int. Cl.[2] B63B *21/56*; H01B *7/12*
U.S. Cl. 340—4 E **10 Claims**



1. A flexible electrode adapted to be towed along its long axis and having forward and aft ends, said electrode including a strength member, a bouyant sleeve surrounding said strength member, and a layer of helically laid wire strands covering said sleeve, said electrode being characterized by the improvement comprising:

a slide member, mounted adjacent said aft end for axial movement relative to said bouyant sleeve;

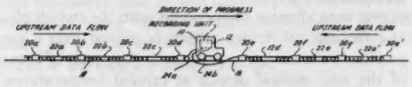
said wire strands having their forward ends fixed relative to said bouyant sleeve and their aft ends fixed to said slide member, whereby excess length in said wire strands that works back along said electrode during use is accommodated by axial movement of said slide member.

4,117,448

SEISMIC TELEMETRIC SYSTEM FOR LAND OPERATIONS

Lee E. Siems, Houston, Tex., assignor to Western Geophysical Company of America, Houston, Tex.

Filed Apr. 13, 1977, Ser. No. 787,176
Int. Cl.[2] G01V *1/22*
U.S. Cl. 340—15.5 TS **16 Claims**



1. In a seismic exploration system a means for enabling a desired switching sequence in, and data-signal transmission from, a plurality of substantially identical transceiver modules each having several input channels and an output channel, disposed over the ground in consecutive order defining a spread, at least one seismic sensor being connected to each of the several input channels, the system comprising:

a recording and control unit;

a wide band transmission link for interconnecting said data transceiver modules in series with each other and with said recording and control unit, said transmission link and said data transceivers being unpolarized so that there is no preferred electrical or physical orientation of said transmission link with respect to said data transceiver modules and to said recording and control unit, said transmission link further including a bidirectional, common signal channel for transmitting both control and data signals independently of each other and in opposite directions between said data transceiver modules and said recording and control unit;

a DC power supply in each said transceiver module;

a conductor pair in said transmission link for transmitting a DC voltage to said power supply; and

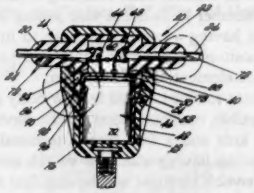
means in each said transceiver for sensing the polarity of the DC voltage on a selected conductor of said conductor pair to define the required direction to signal propagation between said transceivers and said recording and control unit.

4,117,449

FLUID RESISTANT GEOPHONE AND CABLE ENCLOSURE

William O. McNeel, Houston, Tex., assignor to Geo Space Corporation, Houston, Tex.

Filed Aug. 11, 1977, Ser. No. 823,755
Int. Cl.[2] G01V *1/16*
U.S. Cl. 340—17 R **14 Claims**



1. A rigid, fluid resistant enclosure adapted to encase a geophone electrically connected to a cable comprising

a housing means having an open end and inner walls defining a cavity adapted to receive a said geophone encapsulated in a removable fluid tight membrane terminating in a sealing ring located around the top edge of the geophone, said open end of the housing means having a counterbore axially aligned with and formed into said cavity terminating in a countersink having inwardly sloping walls defin-

ing a sealing surface which communicates with the inner walls of said cavity;

a flexible sealing means positioned in the counterbore and countersink of the open end of the housing means and having a hollowed out central area and cable entry means adapted to have a said cable extended therethrough into the hollowed out central area to be electrically connected to a said geophone, said cable entry means having elongated resilient sealing nipples extending from the hollowed out central area to the exterior of the housing and having a plurality of raised protrusions on the interior thereof to intimately engage the exterior of a said cable, said flexible sealing means including means defining an opening to the hollowed out central area located in axial alignment with and spaced a predetermined distance from said counterbore and countersink of the housing means, a sealing collar which extends from the opening into the countersink and counterbore of the housing means and a sealing ridge formed between the edge of the opening and interior surface of the collar, said sealing collar terminating in a tapered edge having inwardly sloping walls which mate with and seal against the sealing surface of the inwardly sloping walls of the countersink of said housing means and a circumferentially extending sealing lip located on the interior of the collar below the sealing ridge which is adapted to engage the exterior surface of a said removable fluid tight membrane; and

means clamping said flexible sealing means into intimate fluid resistant contact with the exterior of said housing means and a fluid tight axial compression seal between the sealing nipples and a said cable extending therethrough, said housing means and said flexible sealing means forming interior fluid tight seals therebetween by urging said sealing ridge of the flexible sealing means against a said ring of a fluid tight membrane to form a fluid tight top compression seal between a said fluid tight membrane and a said geophone top and by urging said tapered edge of the collar against the housing means to form an intimate fluid resistant seal between the mating sloping walls of the countersink and collar, said collar being tightened against a said fluid tight membrane in response to the sealing edges of the countersink and collar making sealing engagement therebetween to direct the circumferential lip formed around the interior of the collar against the exterior surface of a fluid tight membrane to clamp and form a fluid tight lateral compression seal between the sealing lip, a said fluid tight membrane and exterior of a said geophone forming a fluid tight interior within the fluid resistant enclosure.

4,117,450

DEVICE FOR AUTOMATIC SIGNALLING OF AN AUTOMOTIVE VEHICLE DAMAGED BY COLLISION

Roger Lavalley, Pantin; Roger Gozlan, Versailles, and Gilbert Brami, Pantin, all of France, assignors to Serpo "Societe d'Etudes et de Recherches pour la protection, France

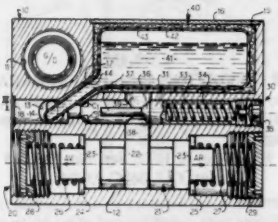
Division of Ser. No. 407,445, Oct. 18, 1973. This application Apr. 27, 1976, Ser. No. 680,664

Claims priority, application France, Feb. 23, 1973, 73.06554; Aug. 14, 1973, 73 29757

Int. Cl.[2] B60Q *9/00*; G01P *15/02*

U.S. Cl. 340—52 H **15 Claims**

5. An inertial sensor device for automatically activating at least one type of signalling means in an automative vehicle, having a longitudinal axis, for providing distress signals to other motorists and comprising at least two inertial pick-ups each of which inertial pick-ups includes tubular guide means having a bore extending along a linear axis thereof, one of said guide means being oriented in parallel relationship to the longitudinal axis of the vehicle and another guide means being oriented transversely of said longitudinal axis; an inertia block slidably mounted within the bore of each said tubular guide means for sliding movement therein in two opposite directions thereof; two spring means oppositely acting respectively on each inertia block along the linear axis of its associated guide means, each said spring means normally urging said block in a different one of said directions, said two springs normally locking their associated inertia block in a predetermined position in its guide means but permitting a small displacement thereof in either one of said directions when the inertia block is subjected to inertial forces exceeding predetermined first threshold values; a spring urged striker operatively related to each inertia block for operation thereby as a function of movement of its inertia block, each striker having a locked untripped position and a released tripped position in which at least one of the signalling means is activated; release means associated with



the respective inertia blocks and strikers adapted to release the relevant striker for movement to its tripped position upon a predetermined displacement of the corresponding inertia block, in either one of said directions, occasioned by exposure of said inertia block to inertial forces exceeding predetermined second threshold values which are greater than the corresponding said first values; said two inertial pick-ups having their strikers mounted for movement, when released by said release means, in the same plane and in intersecting paths; and a single actuating means located in said plane of movement of said strikers substantially at the point of intersection of said intersecting paths.

4,117,451

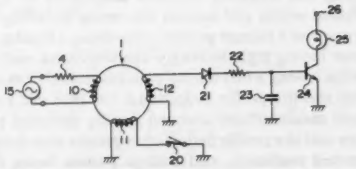
APPARATUS FOR DETECTING VARIATION OF A CONDITION AMOUNT IN A MECHANICAL DEVICE

Kazuo Sato; Haruhiko Toriyama, and Seiichi Matsushige, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Continuation of Ser. No. 486,431, Jul. 8, 1974, abandoned. This application Aug. 10, 1976, Ser. No. 713,194

Int. Cl.[2] B60C *23/00*; B60T *17/22*; G08B *23/00*

U.S. Cl. 340—52 A **8 Claims**



1. An apparatus for detecting variation of a condition amount in a mechanical device comprising

at least one detecting transformer having an input winding, at least one control winding, and an output winding mounted in a single magnetic path,

an alternating current power source connected to said input winding,

at least one normally closed circuit detecting element means to detect a variation of a condition amount by opening of said normally closed circuit detecting element means connected between one of two ends of said control wind-

ing and ground, and the other of said ends of said control winding connected to ground, and

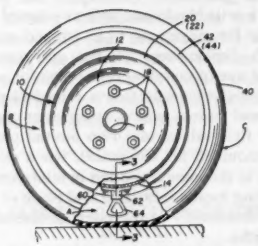
output means connected to said output winding to take out an output signal occurring on said output winding when said normally closed circuit detecting element means is open circuited.

4,117,452

TIRE CONDITION SENSING APPARATUS

Daniel S. Snyder, Norwalk; Steven O. Luzsicza, Huron, and Lyle A. Pauer, Rocky River, all of Ohio, assignors to Gould Inc., Chicago, Ill.

Filed Apr. 6, 1977, Ser. No. 735,018
Int. Cl.² B60C *23/06*
U.S. Cl. 340—58 **7 Claims**



1. Apparatus for sensing the profile condition of a conventional vehicle wheel assembly having an axis of rotation comprised of a rim having an outer peripheral surface with outwardly extending radial flanges at the opposed side edges thereof and a pneumatic tire having an annular road-engaging tread surface with side wall portions at the side edges thereof defining a generally annular tire cavity with said tire adapted to be mounted on said rim and inflated to a predetermined pressure for supporting a vehicle with a predetermined maximum allowable tire profile deflection, said apparatus comprising:

a sensing and actuating structure adapted to be operably mounted within said annular tire cavity including a body portion and a linkage portion comprising a flexible profile sensor having high flexfatigue characteristics, said linkage portion having a first normal position spaced from said tire when said tire profile deflection is less than said predetermined maximum and a second flexibly deflected position when said tire profile deflection is greater than said predetermined maximum, said linkage portion being forcibly moved from said first toward said second position by positive contact from said tire;

energizing means comprising a piezoelectric generator associated with said body portion which is selectively movable between energizing and non-energizing conditions, said energizing means being in said non-energizing condition when said linkage is in said first normal position and being moved into said energizing condition as said linkage is moved toward said second position; and,

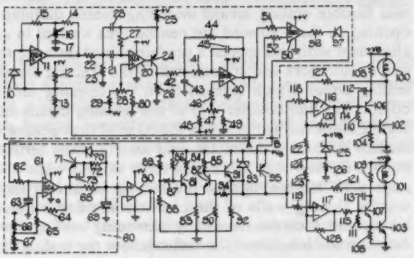
means responsive to said energizing means for indicating that said tire has a profile deflection greater than said predetermined maximum allowable deflection.

4,117,453

VEHICLE HEADLAMP CONTROL CIRCUITS

Duncan Barry Hodgson, Whitnash, near Leamington; John Robert Thornton, Greenlands, and Jonathan Rose, Knowle, all of England, assignors to Lucas Industries Limited, Birmingham, England

Filed Feb. 4, 1977, Ser. No. 765,864
Claims priority, application United Kingdom, Feb. 10, 1976, 5135/76
Int. Cl.² B60Q *1/14*; H05B *39/02*
U.S. Cl. 340—76 **10 Claims**



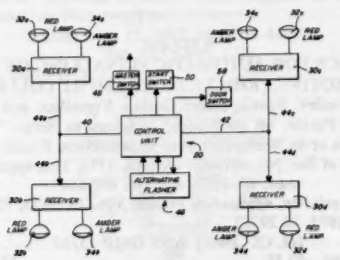
1. A vehicle headlamp control circuit including an incident light detector element and means responsive to only the a.c. component of the detection element output at a frequency related to the street lighting main electricity supply frequency in the locality in which the circuit is intended to be used, characterised by including an averaging circuit for providing a control signal in accordance with the average value of said a.c. component whereby the vehicle lighting is controlled in accordance with the average value of the magnitude of the amplitude of the a.c. component.

4,117,454

STROBE LIGHT SYSTEM FOR SCHOOL BUSES

Lloyd W. Fabry, Wilmette, and Thomas Vinton Brame, Elmwood Park, both of Ill., assignors to Aeroflash Signal Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 588,785, Jun. 20, 1975, Pat. No. 4,011,541. This application Feb. 16, 1977, Ser. No. 768,965
Int. Cl.² B60Q *1/46, 1/26*
U.S. Cl. 340—81 F **4 Claims**



1. In combination with a vehicle lighting system of the type used on school buses and other vehicles as a hazard warning light system and including an alternating flasher, a door switch, and four warning lights consisting of two pairs of red lights, one pair at each end of the vehicle,

time domain dual-function circuitry effective to convert the hazard warning light system from a four light to an eight light system, said circuitry comprising:

a second set of four lights consisting of two pairs of amber lights, one pair at each end of the vehicle,

control means responsive to alternative open and closed

positions of said door switch to provide automatic sequencing and coding signals for predetermined alternating flash illumination of the pairs of red lights and of the pairs of amber lights of said hazard warning light system,

receiving means for directively and selectively energizing each pair of red and each pair of amber lights to obviate any need for a direct separate wire from said control means to each light of said pairs of red lights and amber lights,

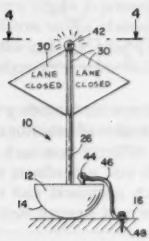
said control means including electrical impedance circuit means constituting electronic delay-non-delay coder means and electronic switching means, said switching means being dependent upon said delay-non-delay coder means, and said coder means and said switching means being operative to modify voltage as applied to said receiver means in said hazard warning light system as a function of an open and a closed position of the vehicle door and of the door switch associated therewith.

4,117,455

SELF-RIGHTING ROADWAY MARKING DEVICE

Lawrence M. Cervantes, 5538 Capellina Way, Santa Barbara, Calif. 93111

Filed Aug. 3, 1976, Ser. No. 711,239
Int. Cl.[2] E01F *9/01*; G09F *7/22*
U.S. Cl. 340—114 R **6 Claims**



1. A self-righting, rotatable roadway marking device comprising in combination:

a base member having a curved lower ground-engaging surface causing the base member to be readily tippable;

a blind bore formed in said base member centrally thereof adapted to releasably and fixedly retain the lower portion of a staff element therein;

a balance weight within the base member and in axial alignment with said bore;

the center of gravity of said balance weight being located below the center of gravity of said bore and in vertical alignment therewith;

an elongated staff element releasably and non-rotatably mounted in said bore;

electric battery means and bulb means carried by said staff element and operatively connected to display a lighted signal;

flexible means for loosely maintaining the device to a roadway; and

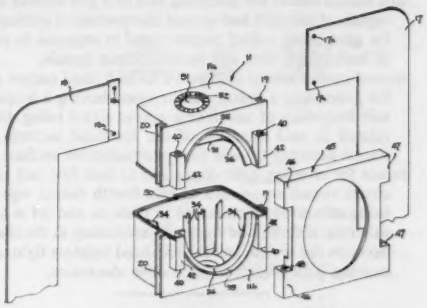
a plurality of stiff wind vanes secured fixedly to said staff element and extending radially outwardly therefrom in equidistantly spaced relation thereabout to cause a tipping and rotating movement of the marking device on its curved lower surface in response to wind forces, the center of gravity of the device being located in relation to the curved surface to produce a restoring movement when the device is tipped, causing the device to be self righting, whereby the marking device exhibits both a tipping and a noticeably rotating movement as a result of wind forces or being struck by a vehicle.

4,117,456

TRAFFIC SIGNAL HOUSING

Leonard N. Albrecht, Beverly Hills, Calif., assignor to Econolite Control Products Inc., Anaheim, Calif.

Filed Jul. 11, 1977, Ser. No. 814,201
Int. Cl.[2] E01F *9/00*
U.S. Cl. 340—119 **7 Claims**



1. A traffic signal housing comprising a pair of similar tray shaped half-section units having front, rear and side walls and joined together along the edges of said walls to form a lamp container, each of said sections including a plurality of stiffening ribs contained therein, said ribs running radially inwardly from the side walls of said sections, an aperture formed in the front walls of said sections, a stiffening rib on the external surface of said front wall running along said aperture, similar posts symmetrically arranged on opposite sides of said front wall, each of said posts having a hinge pin thereon, and

a door with an aperture formed therein, said door having a pair of similar hinge members arranged in spaced relationship with each other along one side of said door and a pair of latch members arranged in spaced relationship with each other along the side of said door opposite said one side thereof, said latch members being spaced from each other the same distance as said hinge members, said hinge members and latch members having apertures formed therein which matingly engage the hinge pins of said containers, whereby said door is adapted to be removably hinged on said container for either left or right hand opening.

4,117,457

LIGHT DETECTION AND SIGNALING SYSTEM

John S. Latta, 9217 Liptonshire, Dallas, Tex. 75238

Filed Mar. 23, 1976, Ser. No. 669,677
Int. Cl.[2] B62J *5/00*; H05B *37/02*
U.S. Cl. 340—134 **8 Claims**

1. A system for detecting and signaling the presence of a moving localized incident light source having an intensity located at a distance from the system wherein the system and the localized incident light source move with respect to each other, comprising:

a first photosensitive surface for detecting the intensity of the localized incident light source, said first photosensitive surface having a configuration for detecting said intensity of the localized incident light source in a 360° arc contained within a horizontal plane surrounding said first photosensitive surface and for generating a first output

signal representative of said intensity of the localized incident light source;

a second photosensitive surface optically isolated from said first photosensitive surface being nonresponsive to the localized incident light source and being substantially responsive to ambient light for generating a second output signal representative of a predetermined level of ambient light;

first circuit means for receiving said first and second output signals of said first and second photosensitive surfaces and for generating a third output signal in response to receipt of both of said first and second output signals;

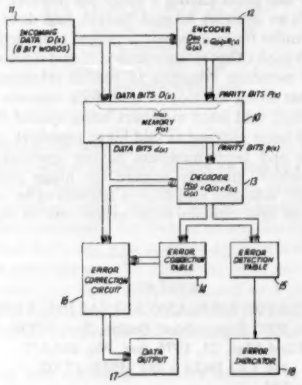
second circuit means responsive to said third output signal for generating a fourth output signal having a frequency, said frequency of said fourth output signal being directly related to said intensity of the localized incident light source detected by said first photosensitive surface; and

means for emitting light connected to said first and second circuit means responsive to said fourth output signal for being selectively illuminated to flash on and off at a variable rate of flash, said flash rate increasing as the distance between the system and the localized incident light source moving with respect to each other decreases.

4,117,458
HIGH SPEED DOUBLE ERROR CORRECTION PLUS TRIPLE ERROR DETECTION SYSTEM

Clement E. Burghard, Huntington Station, and Veronica L. Coletti, Bronx, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Mar. 4, 1977, Ser. No. 774,624
Int. Cl.[2] G06F *11/12*
U.S. Cl. 340—146.1 AL **20 Claims**



1. In a nine bit parity system for eight bit data providing single and double error correction and triple error detection the combination of:

parity generating means for dividing eight bit incoming data D(X) by a polynomial generator G(X) to obtain a quotient Q(X) and a remainder R(X) consisting of nine parity bits;

encoding means connected to said parity generating means for forming a seventeen bit encoded word M(X) including said nine parity bits R(X) concatenated to said incoming data D(X);

decoding means operatively coupled to receive previously encoded words N(X) and divide at least a portion of same by said polynomial generator G(X) to obtain a quotient and an error decode remainder E(X), N(X) being assumed equal to M(X) and free of errors when E(X) equals zero;

an error correction decode table including the values of E(X) corresponding to all possible single and double errors in N(X);

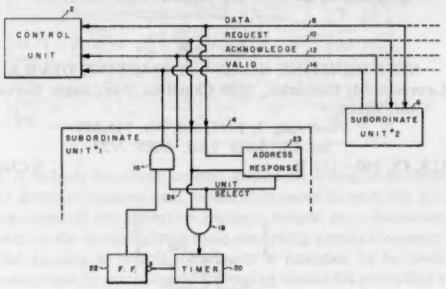
error correction means coupled to said decoding means and said error decode table to correct any single or double errors in the data bits of N(X) as may be indicated by the error decode remainder; and

said generator polynomial G(X) being selected to have a unique value E(X) for each possible single and double error and a value of E(X) other than zero for at least each triple error.

4,117,459
TIME-OUT INTERFACE MEANS

Robert H. Douglas; Edward H. Forrester, and David Murray, all of Phoenix, Ariz., assignors to Honeywell Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 788,586, Apr. 8, 1977, abandoned. This application Jun. 2, 1977, Ser. No. 802,873
Int. Cl.[2] H04Q *1/00*
U.S. Cl. 340—147 R **8 Claims**



1. In a computer system including a control unit having authority over a plurality of subordinate units with response times which may be different from each other, said control unit communicating with said subordinate units by a communication bus over which command and response messages are transmitted between said control unit and said subordinate units,

an interface unit associated with each of said subordinate units,

each of said interface units including an output signal means responsive to a unit selection issued by said control unit to a selected subordinate unit, means including said communication bus for transmitting said output signal to said control unit as a validation of the unit selection,

each of said interface units further including a timing means,

means for initiating the operation of said timing means in response to said unit selection issued by said control unit, each of said timing means being arranged to define a time period slightly longer than the response time of the particular subordinate unit associated therewith and to produce a time-out signal at the end of the defined period,

and means responsive to said time-out signal for terminating said validation output signal whereby to release said control unit from the selected subordinate unit in a minimum time in the event of a failure of a normal performance response from said selected subordinate unit.

4,117,460
SENSING DEVICE

Kirk Sumner Walworth, Tolland, and Anthony Newman Martin, Simsbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 1, 1976, Ser. No. 737,380
Int. Cl.[2] G05B *11/18;* G08B *5/00;* G09F *9/00*
U.S. Cl. 340—190 **6 Claims**

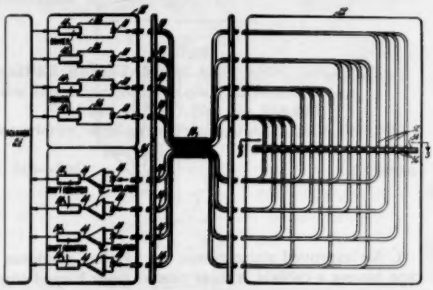
1. A position sensing device comprising:

an optical transmitter having a plurality of illuminating circuits and

means for sequencing the emission of light energy from each of said circuits;

an optical receiver having a plurality of registering circuits wherein each registering circuit is adapted to receive a position signal formed of the sequenced emissions of each transmitting circuit;

for forming said position signal a position encoder having a plurality of channels contained therein and including an optical mask having a plurality of aperture rows disposed in calculated array across said channels so as to



be capable of encoding, from the sequenced emissions of the transmitter, a position signal comprising multiple bits of intelligence which represent the position of the optical mask relative to the channels;

means for collating the multiple bits of intelligence into one or more position signals for transmission to said receiver; and

optically transmissive means communicatively joining the transmitter to the position encoder and position encoder to the receiver.

4,117,461

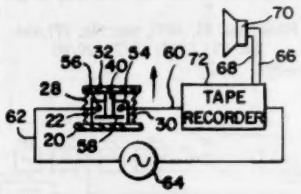
DIET CONTROL APPARATUS

Carol L. Kiebala, 1040 W. Partridge Dr., Palatine, Ill. 60067

Filed Aug. 3, 1976, Ser. No. 711,405

Int. Cl.[2] G08B *3/00, 21/00*

U.S. Cl. 340—545 **9 Claims**



1. Diet control apparatus comprising food storage compartment means for storing food, door means on said food storage compartment means for providing access and cutting off access to the interior of said food storage compartment means, broadcasting means for delivering a message for encouraging dieting operatively connected to said food storage compartment means, activating means to activate said broadcasting means to deliver a message for encouraging dieting when food is sought in said food storage compartment means.

4,117,462

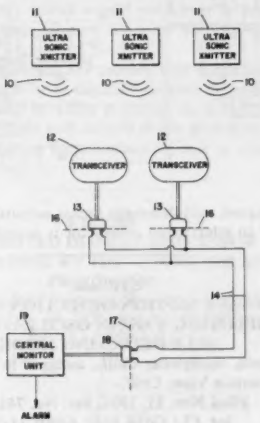
ULTRASONIC TRANSMITTER FOR BURGLAR ALARM SYSTEM

Albert J. Miller, Santa Clara, Calif., assignor to Engineering Systems Corporation, Santa Clara, Calif.

Filed Jun. 1, 1976, Ser. No. 691,790

Int. Cl.[2] G08B *13/08*

U.S. Cl. 340—539 **23 Claims**



1. A burglar alarm system, comprising:

a plurality of ultrasonic transmitter units, each of said units including means for detecting unauthorized intrusion or movement and means for transmitting a plurality of pulses that have a fixed code pattern of pulse durations and intervals between pulses, and a fixed ultrasonic frequency for each pulse in response to actuation of said detecting means;

at least one transceiver means for receiving said ultrasonic pulses and generating a radio frequency signal in response only to both said fixed ultrasonic frequency and said fixed pulse pattern; and

a central monitoring means for receiving said radio frequency signal and emitting an alarm signal in response thereto.

4,117,463

CIRCUIT FAULT DETECTION APPARATUS FOR RAILROAD TRACK CIRCUIT REDUNDANT CONNECTIONS

David John Norton, Bathampton, England, assignor to Westinghouse Brake & Signal Co. Ltd., Chippenham, England

Filed Jul. 14, 1977, Ser. No. 815,474

Claims priority, application United Kingdom, Jul. 28, 1976, 31386/76

Int. Cl.[2] G01R *31/02;* **G08B** *21/00*

U.S. Cl. 340—652 **11 Claims**

1. Circuit fault detection apparatus for a railroad track circuit, which provides a secure connection between one rail of the corresponding track section and a wayside apparatus terminal bus, comprising in combination,

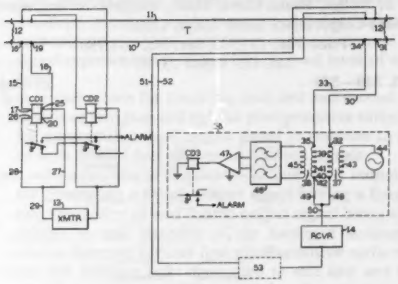
(a) a first electrical conductor connected between a first point on said one rail and a second point,

(b) a second electrical conductor connected between an adjacent third point on said one rail and a fourth point, and

(c) detection means coupled between said second and fourth points and said apparatus terminal bus for completing an electrical connection between said one rail and said apparatus terminal bus when at least one of said first and second conductors remains unbroken,

(d) said detection means being responsive to the pattern of

current flow in said first and second conductors for detecting whether both conductors are complete or one is



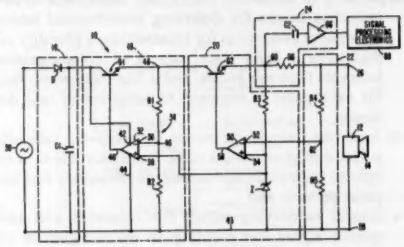
interrupted, said detection means actuating a fault indication if an interrupted conductor is detected.

4,117,464

MICROWAVE MOTION-DETECTION APPARATUS EMPLOYING A GUNN OSCILLATOR IN A SELF-DETECTING MODE

Erno B. Lutz, Sunnyvale, Calif., assignor to Solfan Systems, Inc., Mountain View, Calif.

Filed Nov. 11, 1976, Ser. No. 741,034
Int. Cl.[2] G01S *9/42*; G08B *13/24*
U.S. Cl. 340—554 **6 Claims**



1. A microwave motion detecting apparatus for detecting relative motion of an object comprising:

a first terminal;

a second terminal;

a third terminal;

resistance means connected between said first and second terminals;

a Gunn oscillator connected between said second and third terminals for receiving a predetermined operating potential from which it draws an operating current, said oscillator being operative to generate microwave radiation and when said radiation is reflected by a moving object so as to cause Doppler shifted radiation to be received by said oscillator, develops variations in said operating current;

power supply means having a power output connected between said first and third terminals and a sensing input connected between said second and third terminals, said power supply means being operative to develop said predetermined operating potential between said second and third terminals by developing an output potential between said first and third terminals which exceeds said predetermined operating potential by the voltage drop across said resistance means as determined by said operating current; and

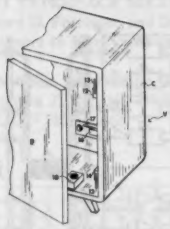
detector means responsive to variations in the potential at said first terminal caused by the voltage drop across said resistance means due to said variations in said operating current, and operative to develop a detected signal indicative of the motion of said object.

4,117,465

ALARM SYSTEM FOR VENDING MACHINES

Stanley W. Timblin, #4 Forest Hill Ct., Greensboro, N.C. 27410

Filed Apr. 7, 1977, Ser. No. 785,588
Int. Cl.[2] G08B *13/08*
U.S. Cl. 340—545 **3 Claims**



1. An improved alarm system for vending machines of the type having a cabinet, a front closure door hinged along one edge to a corresponding front edge of said cabinet, and said door and cabinet including a latch means associated therewith for securely fastening said door to said cabinet; said system comprising:

a. a power source;

b. an electrically operated warning signal device;

c. an electrical circuit connecting said power source and signal device;

d. a plurality of triggering switch means positioned at spaced points in operative relationship between said cabinet and said door for activation responsive to separation of said door and cabinet, at least two of said spaced positions being relatively adjacent either end of the edge of said door and cabinet opposite the hinge side thereof;

e. said switch means arranged in parallel with each other in said circuit between said power source and said signal device, and said signal device being operated responsive to activation of one of said switches;

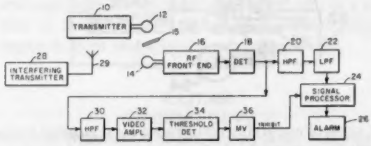
f. whereby the slightest separation of said door from said cabinet at either end of said free edge activates said warning signal device.

4,117,466

BEAT FREQUENCY INTERFERENCE REJECTION CIRCUIT

George Jay Lichtblau, 13 Tannery Hill Rd., Ridgefield, Conn. 06810

Filed Mar. 14, 1977, Ser. No. 777,524
Int. Cl.[2] G08B *13/24, 29/00*
U.S. Cl. 340—501 **10 Claims**



1. For use in an electronic security system having a transmitter producing an electromagnetic field at a frequency repetitively swept through a predetermined range, a resonant tag of resonant frequency within the swept range and receiver means to detect any resonant frequency of the tag produced by the swept field and to provide an alarm indication thereof, an

interference rejection circuit for discriminating between a resonant tag signal and a spurious signal produced by a fixed frequency transmitter having a frequency within the swept range, said circuit comprising:

means operative in response to the detector output signal from said receiver means to detect beat frequencies caused by interference of the swept transmitter frequency and said fixed frequency of an interfering transmitter; and

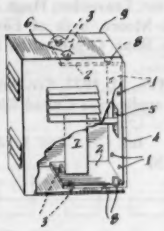
means operative upon such detection to produce a signal to inhibit said alarm indication for the duration of the beat interference.

4,117,467

TAMPER RESISTANT ALARM ANNUNCIATOR

René Liou Tchen San, 10 rue Kellog, Suresnes, France

Filed Jul. 11, 1977, Ser. No. 814,401
Claims priority, application France, Jul. 21, 1976, 76 22183
Int. Cl.[2] G08B *29/00*
U.S. Cl. 340—506 **6 Claims**



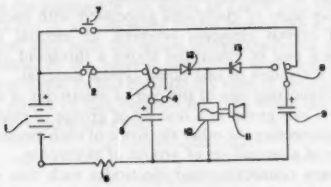
1. A tamper-resistant box for an alarm annunciator comprising a frame adapted to be secured to a support, a moveable cover, a plurality of resilient elements interposed between said frame and said cover for resiliently supporting said cover in slightly spaced relation from said frame, and at least one microinterrupter position to be responsive to movement of the cover relative to the frame to energize the alarm annunciator.

4,117,468

SOUND ALARM FOR PROTECTING BRIEFCASES AND THE LIKE

Tulio Vásquez, Carrera 43-A, No. 30-91, Medellín, Colombia

Filed Mar. 15, 1977, Ser. No. 777,935
Int. Cl.[2] G08B *13/14*
U.S. Cl. 340—571 **11 Claims**



1. An alarm system for use in a small case or hand valise, comprising:

a first electric circuit, including, connected in series,

a power source, and

a condenser;

a switch, located on the exterior of the case or valise, for opening said first circuit when in a first position and for closing said first circuit when in a second position, thereby permitting said power source to energize said condenser when in the second position;

a second electric circuit, connected in series, comprising said condenser, and

an electric sonorous element for emitting a sound alarm when activated by energy accumulated in said condenser;

a single pole double throw switch for closing said first circuit and opening said second circuit when in a first position and for opening said first circuit and closing said second circuit when in a second position, thereby permitting any energy stored in said condenser to activate said electric sonorous element when in the second position; and

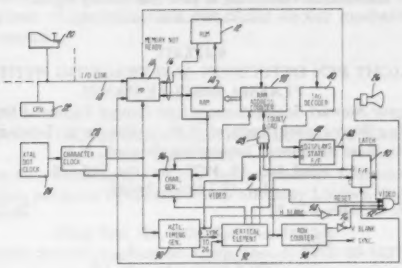
switch changing means for causing said single pole double throw switch to be in the first position thereof when the base of the case or valise is placed on a surface and for causing said single pole double throw switch to switch to the second position thereof when the case or valise is lifted from the surface.

4,117,469

COMPUTER ASSISTED DISPLAY PROCESSOR HAVING MEMORY SHARING BY THE COMPUTER AND THE PROCESSOR

Michael R. Levine, 3605 Frederick Dr., Ann Arbor, Mich. 48105

Filed Dec. 20, 1976, Ser. No. 752,566
Int. Cl.[2] G06F *3/14*
U.S. Cl. 340—324 AD **12 Claims**



1. A display processor, comprising: a digital, program controllable, numerical processor; a display device; means for repeatedly generating a raster of scans of the display device; a random access memory connected to the digital processor and to the display device; a memory address counter connected to the memory and operative to specify the address of a memory location the contents of which are to be provided to the display device; a control program for the digital processor operative to define a plurality of operations to be performed by the processor including the operation of loading into the memory address counter the initial memory address of the first of a series of character codes stored in contiguous memory addresses to be displayed; and means for incrementing the memory address counter in timed relation to the generation of a display on the display device.

4,117,470

DATA BIT COMPRESSION SYSTEM

Alan E. Elliott, Norwood, Mass., assignor to Data General Corporation, Westboro, Mass.

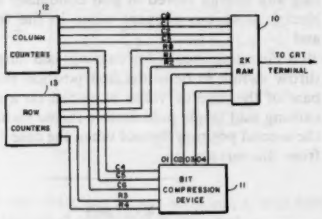
Filed Oct. 8, 1976, Ser. No. 731,034
Int. Cl.[2] G06F *3/14*
U.S. Cl. 340—324 AD **7 Claims**

1. A data bit compression system comprising

means for providing a first binary signal having a first number of parallel bits; and

bit compression means comprising a multiplexer responsive to a first selected group of parallel bits of said first binary signal, said first selected group being less than the total number of bits in said first binary signal and the number of bit combinations of said first selected group of bits which

are required to define the information contained therein being less than the total number of said bit combinations thereof, said bit compressing means producing a second selected group of bits, the number of bits in said second selected group being less than the number of bits in said first selected group and the information in said second selected group corresponding to the complete information in said first selected group;

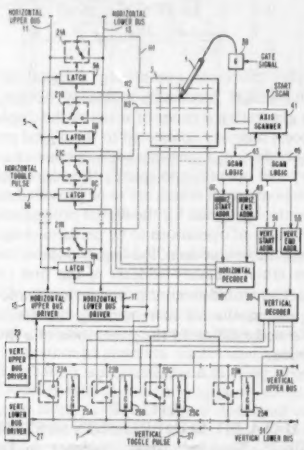


said second selected group of bits, together with the remaining group of bits of said first binary signal not included in said first selected group, thereby providing a second binary signal having a second number of bits which is less than said first number of data bits and containing all of the information contained in said first binary signal.

4,117,471
LIGHT PEN DETECTION AND TRACKING WITH AC PLASMA DISPLAY PANEL

Eugene Stewart Schlig, Somers, and George Raymond Stilwell, Jr., West Nyack, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 18, 1976, Ser. No. 715,465
Int. Cl.[2] G08B *23/00*
U.S. Cl. 340—324 M **25 Claims**



1. A method of detecting the position of a light pen on the display panel of an AC gas discharge display system, comprising:

applying at least one scan voltage complex to a plurality of lines of at least one of the horizontal and vertical axes of said display panel to cause light emission from both addressed "on" and addressed"off" cells thereof without a loss in the previous memory state of said cells, each said complex including at least

a first component of at least a first voltage level of a magnitude approximately equal to the magnitude of the sustain voltage level V_s for said display panel and of a sufficient duration to discharge fully said addressed "on" cells,

a second component of at least a second voltage level of a polarity the same as and a magnitude approximately equal to twice that of said first voltage level and of a sufficient duration to discharge fully said addressed "off" cells, and

a third component of at least a third voltage level of approximately zero volts and of a sufficient duration to discharge fully said addressed "off" cells and return them to their "off" state;

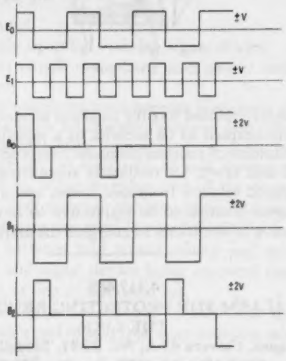
sensing light emission from said panel with said light pen; and

detecting when said light emission is caused by said scan voltage complex.

4,117,472
LIQUID CRYSTAL DISPLAYS

William Gordon Freer, Leavesden; Hugh Andrew Pincherle, and William Thomas Moore, both of London, all of England, assignors to The Rank Organisation Limited, London, England

Filed Feb. 11, 1977, Ser. No. 767,813
Claims priority, application United Kingdom, Feb. 11, 1976, 5356/76
Int. Cl.[2] G06F *3/14*
U.S. Cl. 340—324 M **5 Claims**



1. In a nematic liquid crystal display comprising:

a plurality of liquid crystal elements,

respective pairs of electrodes associated with each of said liquid crystal elements whereby an electric potential across a pair of electrodes above a threshold value can cause activation of said liquid crystal material,

means connecting one of the pair of electrodes of each element in one group of a first set of groups of electrodes,

means connecting the other electrode of each element in one group of a second set of groups of electrodes,

said means connecting said electrodes such that said one electrode and said other electrode of any one element are members of two groups for which no other element has both electrodes as members, and

means for applying to each said group of electrodes a respective waveform signal,

the improvement wherein:

said means for applying a waveform signal to each group of electrodes operates to apply to each group of electrodes of said first set a first or a second waveform signal and to apply to each group of said second set of electrodes a third or a fourth or a fifth waveform signal, said first, second, third, fourth and fifth waveform signals being related in amplitude and phase to each other such that the RMS values of the differences between said first and said third

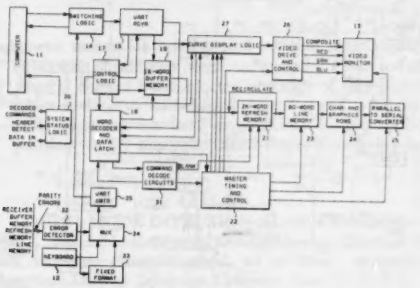
signals, and between said first and said fourth signals, and between said second and said third signals are below said threshold value for said liquid crystal elements, and the RMS values of the differences between said first and said fifth signals, and between said second and said fourth signals, and between said second and said fifth signals are above said threshold value for said liquid crystal elements.

4,117,473

DISPLAY SYSTEM FOR DISPLAYING INFORMATION IN THE FORM OF A HORIZONTALLY ORIENTED CURVE ON A RASTER TYPE CRT

Charles C. Habeger, Jr., and Michael J. Irwin, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 25, 1977, Ser. No. 762,353
Int. Cl.[2] G06F 3/14
U.S. Cl. 340—324 AD **22 Claims**



1. Apparatus for producing a horizontally oriented curve on a raster type cathode ray tube display, comprising:

a cathode ray tube;

means for producing a raster on said cathode ray tube having horizontal scans alternating with retraces;

means for producing a series of curve data point signals;

a memory means;

means for storing said series of curve data point signals in said memory means in the sequence in which they are produced;

means for reading out of said memory means all of said series of curve data point signals in synchronization with each horizontal scan of the raster on the cathode ray tube;

means for establishing a signal representative of the vertical position of the current horizontal scan of the raster; and

means for comparing the series of curve data point signals read out of said memory means during the current horizontal scan with the signal representative of the vertical position of the current horizontal scan and applying a video signal to said cathode ray tube to produce a dot on the screen of said cathode ray tube when the thus compared signals are equal.

4,117,474

COMMUNICATIONS DEVICE WITH PLURAL, POWER-OPERATED DISPLAY MECHANISMS SELECTIVELY CONTROLLED BY AN OPERATOR

Lloyd E. Augustine, P.O. Box 3175, University of Oregon, Eugene, Oreg. 97403

Filed Nov. 19, 1976, Ser. No. 743,112
Int. Cl.[2] G09F 9/00
U.S. Cl. 340—325 **9 Claims**

1. A communications device comprising

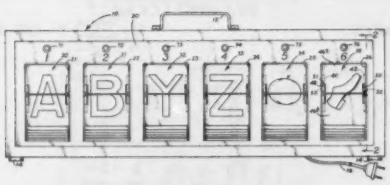
a housing,

plural power-operated information display mechanisms exposed on one side of the housing, each mechanism when in an operating state displaying recurrently and in succession different information symbols,

scan indicating means for designating selected ones of said display mechanisms, and

control means controlling operation of said display mechanisms and said scan indicating means,

said control means including scan means producing a scan phase of operation where selectively and recurrently different ones of said display mechanisms are placed in a standby state and the scan indicating means operates to



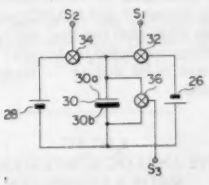
designate the particular display mechanism placed in such standby state, said control means additionally including means controlled by the operator of the communications device actuatable to start and actuatable to stop operation of a display mechanism when such is in a standby state as produced by said scan means, the scan means of said control means being constructed to discontinue the scan phase of operation with one of the display mechanisms operating.

4,117,475

DRIVER CIRCUIT FOR ELECTROCHROMIC DISPLAY DEVICE

Heihachiro Ebihara, and Fukuo Sekiya, both of Tokorozawa, Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan

Filed Nov. 26, 1976, Ser. No. 745,138
Claims priority, application Japan, Dec. 1, 1975, 50-143762
Int. Cl.[2] G09F 9/32
U.S. Cl. 340—336 **11 Claims**



1. A driver circuit for an electro-chromic display device having a persistence effect and a plurality of display elements adapted to display information in response to display information signals, comprising:

means for generating first and second drive signals in response to a change of each display information signal for thereby driving said each display element; and

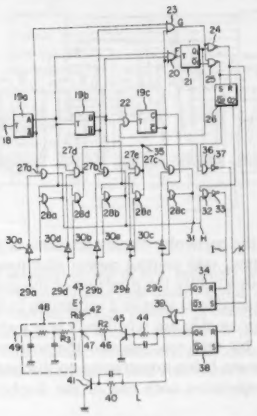
means for generating control signals just prior to said drive signals in response to said change of said each display information signal for thereby short-circuiting said each display element just prior to driving said each display element;

said first and second drive signals having a narrow pulse width, whereby said each display element is driven only for predetermined short time intervals and maintained in its open state during time intervals other than said predetermined short time intervals to display said information due to its persistence effect.

4,117,476
DIGITAL-TO-ANALOG CONVERTER

Yukio Koyanagi, Katano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed Feb. 2, 1977, Ser. No. 764,761
Claims priority, application Japan, Jun. 2, 1976, 51-12522
Int. Cl.[2] H03K *13/20*
U.S. Cl. 340—347 DA 5 Claims



1. A digital to analog converter comprising a serial counter having $n - m$ (where $n > m$) flip-flops arranged to deliver a first output consisting of m-bits and a second output consisting of $n - m$ bits, means for combining pulses corresponding to said m-bit and $(n - m)$-bit outputs in weighted fashion to derive an n-bit output, means for filtering said combined pulses to derive a DC output, an AND gate interconnected between the m-th and $(m + 1)$-th flip-flops of said counter, the output of said m-th flip-flop being connected to one input of said AND gate and the output of said m-th flip-flop being connected to the input of said $(m + 1)$-th flip-flop, the outputs of the first to m-th flip-flops being connected to the inputs of a first NAND gate and the outputs of the $(m + 1)$-th to the last flip-flops being connected to the remaining inputs of said NAND gate, the output of said NAND gate being connected to the input of an additional flip-flop, the output of said additional flip-flop being connected to the other input of said AND gate, whereby said m-bit and $(n - m)$-bit outputs may be alternately derived.

4,117,477
SINGLE-POINT ANALOG SUBSYSTEM INTERFACED WITH A COMPUTER

William E. Zitelli, Media, and Andras I. Szabo, Export, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 689,626, May 24, 1976, abandoned, which is a continuation of Ser. No. 529,200, Dec. 3, 1974, abandoned, which is a continuation of Ser. No. 362,990, May 22, 1973, abandoned. This application Sep. 15, 1977, Ser. No. 833,550
Int. Cl.[2] H03K *13/20*
U.S. Cl. 340—347 NT 1 Claim

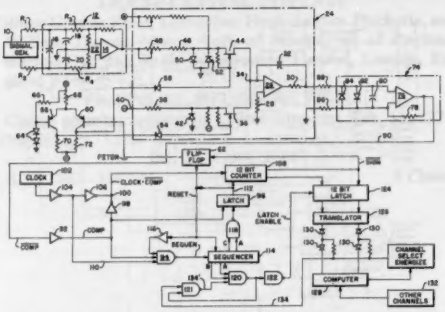
1. In a single-point analog-to-digital subsystem interfaced with a digital computer and operative with successive conversion cycles from said single-point, a dual slope integrator operative with an analog input signal derived from said single-point, during each of said successive conversion cycles for storing a charge during a first mode characterized by a charging slope related to the magnitude of said analog input signal and for discharging the stored charge during a second mode characterized by a constant discharging slope, the combination of:

comparator means responsive to said integrator for continuously comparing a voltage representative of said stored charge to a threshold voltage and for detecting a voltage cross-over in either directions;

a counter operative during said second mode for generating a time-related count;

said comparator means being operative upon a first cross-over in one direction to initiate a fixed time interval during said first mode, said comparator means being operative upon a second cross-over in the opposite direction during said second mode to disable said counter, thereby to establish a final count in said counter relative to a current conversion cycle;

sequencer means actuated by said comparator means during a given conversion cycle in response to said second cross-over for establishing a first predetermined time interval after said second cross-over and for initiating said first mode for a subsequent conversion cycle at the end of said first predetermined time interval, said sequencer means



also resetting said counter at the end of said first predetermined time interval;

latching means being provided operative with said counter for storing said final count;

said computer interrogating said subsystem from time-to-time to acquire said final count;

said sequencer means being further responsive to said second cross-over for establishing a second predetermined time interval therefrom, said second time interval being shorter than said first time interval;

means being provided responsive to said sequencer means for generating an enabling signal for transferring the count in said counter into said latching register means at the end of said second predetermined time interval; and,

means for preventing the generation of said enabling signal when said sequencer means operates at the end of said second predetermined time interval in conjunction with an interrogation by said computer.

4,117,478
VARIABLE CHARACTER DISPLAY DEVICE

Alfred Skrobisch, Huntington Station, N.Y., assignor to The Staver Company, Incorporated, Bay Shore, N.Y.

Filed Oct. 12, 1976, Ser. No. 731,843
Int. Cl.[2] G08B *5/26*
U.S. Cl. 340—378 R 10 Claims

1. A variable character display device, comprising;

a base plate;

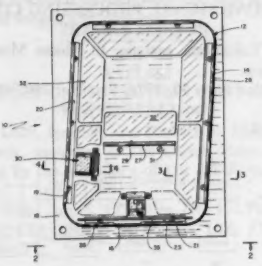
a multiplicity of variable segment display mechanisms mounted on said base plate in a predetermined array, each of said mechanisms comprising:

a substantially flat display segment having a display face for displaying a portion of a character;

an arm connected perpendicularly to said display segment and extending therefrom;

a rotating means connected to said arm remote from said display segment for rotating said segment between a dis-

play position wherein said display face is wholly exposed in a display plane parallel to said base plate and a retracted position wherein said display face is turned more than 90° away from said display plane toward said base plate wherein said rotating means lie in a plane substantially below said display plane; and



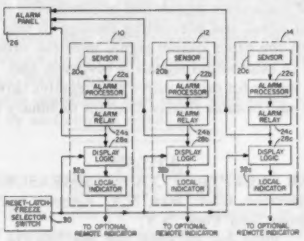
magnetic means for holding said segment magnetically in either one of said two positions, whereby a selected character is defined by a selected plurality of said segments when rotated to said display position, and whereby all other segments are held magnetically in said retracted position wholly concealing their respective display faces.

4,117,479

MULTI-MODE INTRUSION ALARM SYSTEM

Aaron A. Galvin, Lexington; L. Dennis Shapiro, Chestnut Hill, and Valdemar Skov, Wayland, all of Mass., assignors to American District Telegraph Company, New York, N.Y.

Filed Apr. 16, 1976, Ser. No. 677,661
Int. Cl.² G08B 29/00
U.S. Cl. 340—502 **3 Claims**



1. For use in an alarm system having a plurality of sensors for detecting an alarm condition and for providing an alarm signal representative thereof, an indicator system comprising:

selector means for selecting one of at least three modes and for providing latch, reset, and freeze signals to indicate the current selection of first, second, and third modes respectively;

a like plurality of latch means each corresponding to a respective one of said sensors and each having at least two output states, each of said latch means including:

means, operative during the presence of the latch signal from said selector means, for setting the latch means to the first output state in response to an alarm signal from the corresponding one of the plurality of sensors; and

means, operative during the presence of the reset signal from said selector means and only in the absence of an alarm signal from the corresponding sensor, for resetting the latch means to the second output state; and

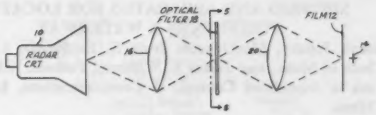
means, operative during the occurrence of the freeze signal from the selector means, for rendering the latch means output state unalterable as long as the freeze signal is present.

4,117,480

REAL TIME SIGNAL CORRELATOR FOR HIGH RESOLUTION RADAR

William R. Boario, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 12, 1965, Ser. No. 425,095
Int. Cl.² G01S 9/02
U.S. Cl. 343—5 CM **2 Claims**



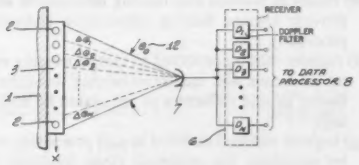
1. A real time signal correlator for use on high resolution mapping radar apparatus aboard a moving aircraft having a ground speed indicator and comprising on an optical axis in the order named: A time modulating light source, a first cylindrical lens, an optical filter having at least one optically apertured time variable function and located to be substantially at the imaging plane of said first cylindrical lens, a second cylindrical lens optically parallel to said first cylindrical lens, and an optically sensitive film substantially at the imaging plane of said second cylindrical lens normal to the optical path and movable in a direction parallel to the time variable function on said optical filter, the linear velocity of said film being synchronized to the ground speed indicator on the aircraft so that when the time function of said modulating light source is identical with the time variable function of said optical filter the two time variable functions are correlated and impressed upon said film.

4,117,481

SIDELOOKING RADAR AND SYSTEM FOR IDENTIFYING OBJECTS

James Nickolas Constant, 1603 Danbury Dr., Clarmont, Calif. 91711

Continuation-in-part of Ser. No. 257,932, May 30, 1972, abandoned. This application Mar. 15, 1977, Ser. No. 777,763
Int. Cl.² G01S 9/56
U.S. Cl. 343—6.5 SS **30 Claims**



1. A detection system comprising in combination:

a transmitter including a transmitting antenna for generating a first signal of predetermined carrier frequency, time duration and bandwidth;

a receiver including a receiving antenna for receiving first FM signals of predetermined carrier frequency *f*, time duration T and bandwidth B,

each of said first FM signals being the response of one of a transit of a target through the beam of said transmitting antenna, signaling by a target in the beam of said transmitting antenna, and signaling by said transmitter via said target;

a doppler filter bank included in said receiver for detecting

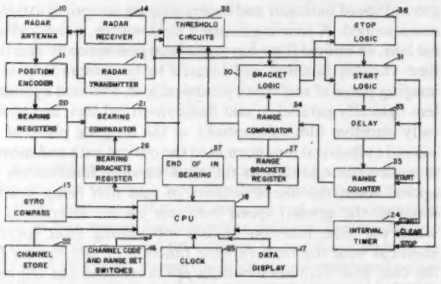
each of said first FM signals as one of a plurality of second FM signals of predetermined carrier frequency $f + f_D$, time duration T/N and bandwidth Δf, each of said second FM signals being obtained from a filter in said doppler filter bank, and an AM modulated FM signal obtained from the combined output of filters in said doppler filter bank, said AM being produced by the spectral response characteristics of filters in said doppler filter bank; and

a signal processor having the receiver output as its input and including means for processing and decoding said detected first FM signals.

4,117,482
METHOD AND APPARATUS FOR LOCATING POSITION IN A WATERWAY

Joseph Jepsky, Marblehead; Irvin S. Englander, Cambridge, both of Mass., and James E. Williams, Pelham, N.H., assignors to Associated Controls & Communications, Inc., Lynn, Mass.

Filed Jul. 7, 1977, Ser. No. 813,481
Int. Cl.² G01S 9/04
U.S. Cl. 343—7.3 **4 Claims**



1. On board navigational apparatus operative with radar reflectors located at fixed predetermined positions relative to channels of a waterway comprising:

(a) a radar set consisting of a radar transmitter, radar receiver and a rotatable antenna;

(b) a central processing unit;

(c) a data processing memory connected to said processing unit and containing channel geometry data relative to radar reflectors at fixed positions;

(d) manual control means connected to index said memory;

(e) means to provide ship bearing information and means to provide antenna bearing information connected to said processing unit;

(f) register means connected to said processing unit to register maximum and minimum bearing locations of one reflector of said reflectors as calculated by said processing unit;

(g) register means connected to said processing unit to register maximum and minimum range locations of said one reflector as calculated by said processing unit;

(h) interval timer means connected to said processing unit to time range intervals commencing with a trigger from said radar transmitter and providing an output to said processing unit;

(i) start logic means connected between said radar transmitter and said interval timer enabling only radar triggers occurring between said minimum and maximum bearing locations to start said timer;

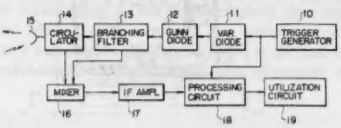
(j) stop logic means connected between said radar receiver and said timer inhibiting stop of said timer on radar echoes received outside of said minimum and maximum range locations and both stopping said timer and transferring its contents to said central processing unit on an echo received inside said minimum an maximum range locations; and,

(k) delay means connected between said start logic means and said interval timer for clearing said timer a predetermined delayed time interval after each start of said timer.

4,117,483
NOISE-IMMUNE SIGNAL PROCESSING CIRCUIT FOR PULSED RADARS

Norio Fujiki, Yokohama, assignor to Nissan Motor Company, Limited, Japan

Filed Nov. 10, 1976, Ser. No. 740,746
Int. Cl.² G01S 9/44
U.S. Cl. 343—8 **7 Claims**



1. A pulse radar having means for transmitting pulsed high-frequency electromagnetic energy to an object moving relative to a given point and means for receiving a signal returned from the object, means for converting said signal into an intermediate frequency signal which varies in phase with the speed of said object relative to said given point, and a circuit for processing said intermediate frequency signal in order to determine said relative speed, said processing circuit comprising:

means for generating a first output signal when a positive half wave of said intermediate frequency signal reaches a positive threshold level and generating a second output signal when a negative half wave of said intermediate frequency signal reaches a negative threshold level;

a bistable device responsive to the first and second output signals to assume first and second binary states, respectively;

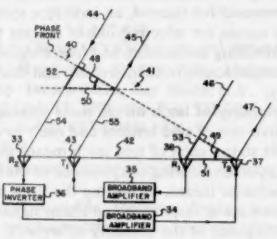
means for permitting passage to said bistable device of the one of said output signals that occurs earlier than the other output signal and preventing passage to said bistable device of the other output signal until the order of occurrence of said output signals is reversed; and

varying means for said positive and negative threshold levels when said bistable device changes its binary state.

4,117,484
ANGULAR DECEPTION COUNTERMEASURE SYSTEM

Peter K. Shizume, Glen Oaks, N.Y., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Jul. 31, 1958, Ser. No. 753,174
Int. Cl.² G01S 7/38
U.S. Cl. 343—18 E **3 Claims**



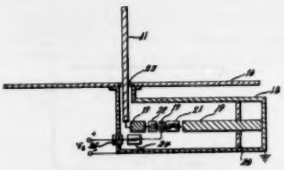
1. A pair of electromagnetic energy transponders, each transponder comprising means for receiving incident microwave energy and means for transmitting said energy, said means for receiving and means for transmitting being intercon-

nected in respective pairs by individual amplifying means, the electrical path lengths of said transponders being substantially identical, one of said transponders further including phase inverting means, and supporting means for spatially locating the receiving means of each of said transponders at respective extremities of a first straight line and for spatially locating the transmitting means of each of said transponders at respective extremities of a second straight line, said first and second lines being of equal length and coplanar.

4,117,485
RADAR TARGET CROSS SECTION CONTROL METHOD AND MEANS

Benjamin B. Gorr, Ipswich, and Richard B. Mack, Winchester, both of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 5, 1971, Ser. No. 105,749
Int. Cl.[2] G01S *7/38;* **H01Q** *15/00, 17/00*
U.S. Cl. 343—18 E **11 Claims**



1. A radar target having cross section control means, said cross section control means comprising
means for detecting incident electromagnetic wave energy,
means for generating therefrom a control signal responsive to the frequency thereof, and
means for loading said radar target with a variable impedance load, said variable impedance load having electrical characteristics that effect non-increasing capacitive reactance values in response to increasing incident electromagnetic wave frequency,
said variable impedance load being responsive to and controlled by said control signal.

4,117,486
BUOYANT CHAFF

Chester E. Sharp, Little Silver, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

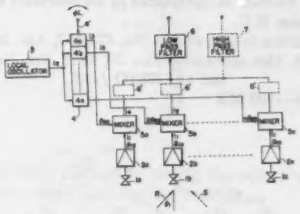
Filed Jun. 5, 1961, Ser. No. 115,045
Int. Cl.[2] G01S *7/36, 7/42;* **H01Q** *17/00*
U.S. Cl. 343—18 B **2 Claims**

1. A buoyant elongated tubular chaff element responsive to radio frequency energy comprising a hollow longitudinal body of relatively thin light weight flexible metal, a quantity of a gaseous medium lighter than air contained within said body sufficient to partially inflate the said body at normal atmospheric pressure and to fully inflate the said body at an altitude where the body weight equals the air displaced, the length of said body being substantially equal to one half the wave length of the radio frequency of operation.

4,117,487
ELECTRONICALLY SCANNED ECHO PULSE RECEIVER

Kiyomi Minohara, Takarazuka, and Akira Sugiyama, Ashiya, both of Japan, assignors to Furuno Electric Co., Ltd., Nagasaki, Japan

Filed Apr. 15, 1977, Ser. No. 787,823
Claims priority, application Japan, Apr. 15, 1976, 51/43293; Jan. 27, 1977, 52/8359
Int. Cl.[2] H01Q *3/26*
U.S. Cl. 343—100 SA **11 Claims**

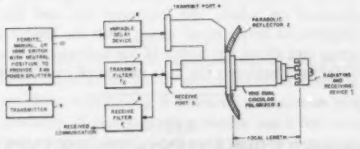


1. A reception beam directional control system for varying the relative phases of the output signals produced by at least a pair of pulse echo receiving transducers spaced apart at a fixed interval, for combining such phase-shifted signals to obtain a reception beam, and for electronically controlling the directional orientation thereof, comprising:
a. a local oscillator,
b. a plurality of variable phase shifters corresponding to the number of said receiving transducers for progressively shifting the phase of the output signal of said local oscillator,
c. a plurality of mixers for respectively modulating the received signals produced by said transducers with the output signals from said phase shifters,
d. means for combining together the output signals from said plurality of mixers, and
e. means for selecting at least one of the sideband frequencies of the combined output signals from said mixers.

4,117,488
MULTIPURPOSE, MULTIFUNCTION ANTENNA

Emmanual Joseph Perrotti, Ramsey, N.J., assignor to International Telephone and Telegraph Corp., Nutley, N.J.

Filed Jan. 21, 1976, Ser. No. 651,090
Int. Cl.[2] H01Q *21/24, 15/24*
U.S. Cl. 343—100 PE **3 Claims**



3. A multipurpose multifunction antenna comprising:
a dual circularly polarized radiating and receiving means;
a dual circular polarizer coupled to said means;
a transmit port coupled to said polarizer;
a receive port coupled to said polarizer; and
a circuit arrangement coupled to said transmit and receive ports to enable radiation of a selected one of vertical linearly polarized waves, one of right hand and left hand dual circularly polarized waves and linearly polarized waves having a selected angle of polarization and reception of the other of right hand and left hand dual circularly polarized waves;
said circuit arrangement including

a transmitter,
a variable delay device coupled to said transmit port,
a transmit filter coupled to said receive port,
a receive filter coupled to said receive port,
a switch having a neutral position to provide a three decibel power splitter coupled to said transmitter, said delay device and said transmit filter.

4,117,489

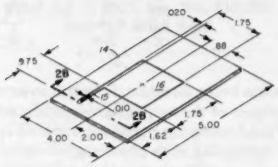
CORNER FED ELECTRIC MICROSTRIP DIPOLE ANTENNA

Cyril M. Kaloi, Thousand Oaks, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation-in-part of Ser. No. 571,152, Apr. 24, 1975, abandoned. This application Jan. 23, 1978, Ser. No. 871,573

Int. Cl.[2] H01Q *1/38*

U.S. Cl. 343—700 MS **6 Claims**



1. A corner fed electric microstrip dipole antenna having low physical profile and conformal arraying capability, comprising:

a. a thin ground plane conductor;
b. a thin square radiating element spaced from said ground plane;
c. said radiating element being electrically separated from said ground plane by a dielectric substrate;
d. said radiating element having a feed point located at a single corner thereof;
e. the length and width of said radiating element being equal and determining the resonant frequency along the length and width, respectively, of said antenna;
f. the antenna bandwidth being variable with the width dimension of the radiating element and the spacing between said radiating element and said ground plane, said spacing between the radiating element and the ground plane having somewhat greater effect on the bandwidth than the element width, the physical length of said radiating element being changed accordingly with the width thereof to maintain a square radiating element as the physical width is changed to vary the bandwidth; and
g. the polarization of said antenna being linear along the diagonal on which the feedpoint lies and the resonant frequencies being equal along both the length of the antenna and along the width of the antenna with zero phase difference between the two modes of oscillation.

4,117,490

INCONSPICUOUS ANTENNA SYSTEM EMPLOYING THE AIRFRAME AS AN ANTENNA

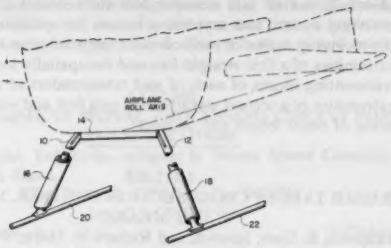
James J. Arnold, deceased, late of Farmingdale, N.J. (by Susan Arnold, executrix); Donn V. Campbell, Eatontown; Charles M. DeSantis, Neptune, and Felix Schwering, Eatontown, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 15, 1977, Ser. No. 824,364

Int. Cl.[2] H01Q *1/32*

U.S. Cl. 343—708 **12 Claims**

1. A phase front homing airplane antenna array comprising:
a pair of spaced substantially vertical sections of the metallic airframe of said airplane; and
discrete coaxial coupling means comprising a pair of spaced concentric metallic cylindrical sleeves, identical in structure, encompassing a portion of said vertical sections, the



combination of each of said coupling means and its associated vertical section comprising one of a pair of antennas of said array.

4,117,491

LOGARITHMICALLY PERIODIC LOOP ANTENNA ARRAY WITH SPACED FILTERS IN THE COUPLING NETWORK

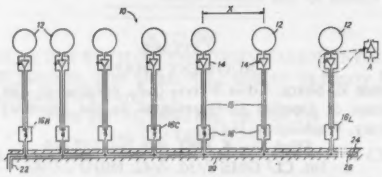
Kheder Abdul Karim Hanna, and Brian Stuart Collins, both of Rochester, England, assignors to C & S Antennas Limited, Rochester, England

Filed Jul. 29, 1976, Ser. No. 709,625

Claims priority, application United Kingdom, Aug. 20, 1975, 34646/75

Int. Cl.[2] H01Q *11/10, 3/24*

U.S. Cl. 343—742 **17 Claims**



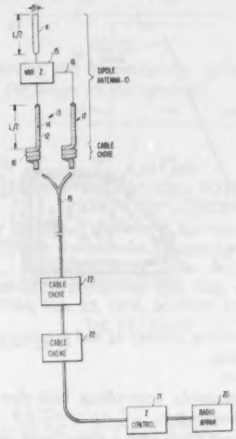
1. An aerial array, comprising:
feed terminal means;
a plurality of spaced substantially linearly-arranged broadband active aerial elements with substantially equal impedance, all of said elements being of substantially identical size and electrical characteristics, and the spacing between adjacent ones of said elements along said array being in a progressive logarithmic variation, and
a plurality of filters each connected individually between a respective one of said aerial elements and said feed terminal means, said filters having progressive frequency-sensitive characteristics along the array such as to tend to pass between the associated element and said feed terminal means higher frequencies where said elements are more closely spaced and lower frequencies where said elements are more widely spaced.

4,117,492

LOW PROFILE REMOTELY TUNED DIPOLE ANTENNA

James J. Arnold, deceased, late of Farmingdale, N.J. (by Susan Arnold, executrix), and Donn V. Campbell, Eatontown, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 26, 1977, Ser. No. 819,194
Int. Cl.[2] H01Q 9/16
U.S. Cl. 343—747 14 Claims



1. A center-fed broadband dipole antenna system which is adapted to be remotely tuned for the transmission or reception of electromagnetic energy, comprising in combination:

a dipole antenna consisting of an electrically short, substantially less than a quarter wavelength, conductor element of a predetermined length and transverse cross-sectional width, and a length, substantially equal to said predetermined length, of outer conductor of a feed transmission line having an inner conductor and outer conductor, said conductor element and said length of outer conductor being mutually linearly opposed to one another at a feedpoint of said inner conductor;

said feed transmission line additionally being configured to include a cable choke section adjacent said length of outer conductor at the opposite end thereof from the feedpoint end; and

remotely controlled variable impedance means electrically coupling said feedpoint to said dipole antenna for resonating said antenna to a selected operating frequency.

4,117,493

RADIO ANTENNA

John Altmayer, Cape Coral, Fla., assignor to New-Tronics Corp., Brookpark, Ohio

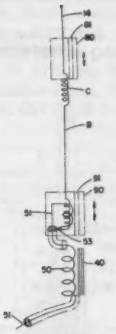
Filed Dec. 22, 1976, Ser. No. 753,318
Int. Cl.[2] H01Q 1/32, 9/00, 1/00, 1/08
U.S. Cl. 343—750 30 Claims

1. A radio transmitting antenna comprised of:

an elongated conductive member having its ends in generally fixed spaced relationship and having an effective electrical length generally equal to λ/2 at the desired frequency of operation;

means at one end of said conductive member for coupling said end of said conductive member to at least a transmitter tuned to said frequency;

and elongated generally rigid electrical insulating means extending beyond at least one end of said conductive member, the amount of extension being adjustable whereby said antenna may be elongated independently of the length of the conductive member and may be supported in any position by having the ends of said antenna engage opposed surfaces of a building.

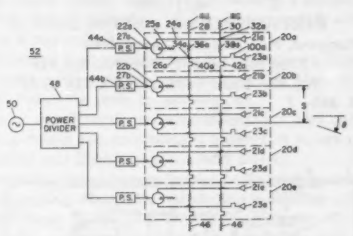


4,117,494

ANTENNA COUPLING NETWORK WITH ELEMENT PATTERN SHIFT

Richard F. Frazita, Deer Park, N.Y., assignor to Hazeltine Corporation, Greenlawn, N.Y.

Filed Mar. 31, 1977, Ser. No. 783,237
Int. Cl.[2] H01Q 3/26
U.S. Cl. 343—844 7 Claims



1. In an antenna system for radiating wave energy signals into a selected angular region of space wherein there is provided an aperture comprising a plurality of antenna element groups, a plurality of first coupling means, each for coupling supplied wave energy signals to the elements in a corresponding element group, and second coupling means interconnecting said plurality of first coupling means to cause wave energy signals supplied to any of said first coupling means to be additionally supplied to selected elements in the remaining element groups, the improvement wherein:

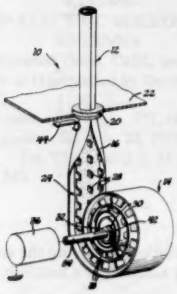
said second coupling means includes a plurality of first phase adjustment means, each associated with one of said element groups, said phase adjustment means providing opposite sense phase adjustments for signals coupled in opposite directions with respect to said aperture, whereby the angular location of said selected region of space with respect to said aperture may be adjusted by adjustment of said phase adjustment means.

4,117,495

SELF-TUNING DEPLOYABLE ANTENNA

Peter A. Hochstein, 14020 15 Mile Rd., Sterling Heights, Mich. 48077

Filed Mar. 1, 1977, Ser. No. 773,155
Int. Cl.[2] H01Q *11/12, 9/00, 1/12, 1/10*
U.S. Cl. 343—877 26 Claims



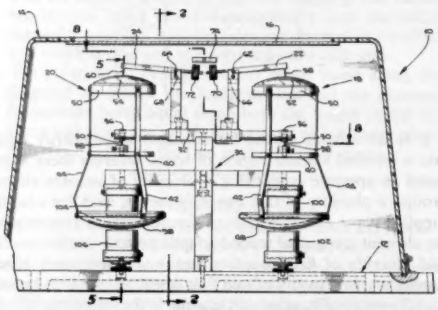
1. An extensible antenna assembly comprising; an elongated antenna for radiating and receiving radio frequency energy and being extensible and retractable longitudinally of its length between a retracted position and fully extended position; and tuning means for automatically maintaining said antenna resonant at a single predetermined frequency in correlation with and responsive to the various extended positions of said antenna.

4,117,496

EARTHQUAKE RECORDING DEVICE

Ali Sattaripour, P.O. Box 85, Tehran, Iran

Filed Sep. 23, 1977, Ser. No. 835,915
Int. Cl.[2] G01D *9/04, 15/16;* G01V *1/16*
U.S. Cl. 346—7 6 Claims



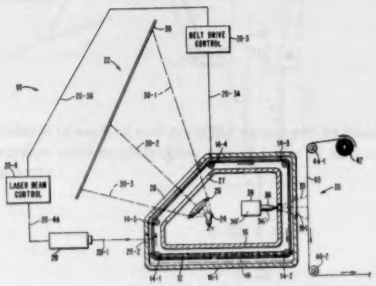
5. A shock recording device comprising:
a base;
a compound pendulum mounted to said base and having a natural frequency;
means for recording the movement of said compound pendulum in response to a shock; and
timing means for enabling said means for recording to record the passage of predetermined time intervals during said movement.

4,117,497

PRINTING AND DISPLAYING TECHNOLOGY USING SELECTIVE LASER BEAM PRICKING OF LIQUID FILM FOR WRITING INFORMATION

James Cleary McGroddy, Putnam Valley, N.Y., and James Alden Van Vechten, Basking Ridge, N.J., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 21, 1976, Ser. No. 734,578
Int. Cl.[2] G01D *15/14*
U.S. Cl. 346—17 12 Claims



1. Apparatus for writing, displaying and printing an information pattern comprising,
a laser beam source;
means for programmably controlling both the scan and power of said laser beam;
an endless belt screen mesh with a plurality of interstices in a regular geometric format;
chamber means for containing a source of liquid ink susceptible of forming stable films therefrom on said interstices;
said screen material and said liquid material being interrelated such that either said liquid adheres more strongly to said screen mesh than it coheres to itself or said liquid coheres more strongly to itself than it adheres to said screen material;
means for driving said screen mesh through a portion of said liquid;
means for controlling the positioning of said screen mesh with said liquid in said interstices in communicating relationship with said laser beam and for removing directly and selectively a pattern of said films in said interstices by said laser beam to form orifices thereat respectively as said information pattern;
a displaying station for said stored information; and
a printing station for said stored information including means for projecting ink onto a collector medium surface.

4,117,498

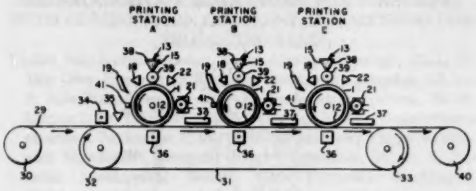
MAGNETIC PRINTING PROCESS AND APPARATUS

Donald William Edwards, Wilmington, Del., and Emery John Gorondy, Chadds Ford, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 672,553, Mar. 31, 1976, abandoned. This application Feb. 25, 1977, Ser. No. 771,062
Int. Cl.[2] G03G *19/00;* G01D *15/12*
U.S. Cl. 346—74.1 88 Claims

1. Magnetic printing process comprising:
(a) forming a magnetic image on a ferromagnetic material which is imposed on an electrically conductive support;
(b) developing the magnetic image by decorating the image with a ferromagnetic toner comprising a ferromagnetic component, a dye and/or chemical treating agent and a water-soluble or water-solubilizable resin which substantially encapsulates the ferromagnetic component and the dye and/or chemical treating agent;
(c) transferring the developed image to a substrate;

(d) permanently fixing the dye and/or chemical treating agent of the image on the substrate; and



(e) removing the ferromagnetic component and the resin from the image on the substrate.

4,117,499

PHOTOGRAPHIC CAMERA WITH AUTOMATIC EXPOSURE CONTROL

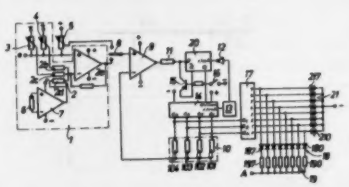
Karl-Peter Strauss, Volkmarode, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Filed Feb. 22, 1977, Ser. No. 770,849

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1976, 2607544; Feb. 25, 1976, 2607589; Feb. 25, 1976, 2607615

Int. Cl.[2] G03B 7/08

U.S. Cl. 354—23 D **34 Claims**



1. Photographic camera control mechanism for producing a control output signal useful for controlling one of the two exposure factors of exposure time and diaphragm aperture, said control mechanism comprising

(a) electronic circuit means for generating a first analog signal responsive to subject brightness, film sensitivity, and an exposure factor other than one to be controlled by said control output signal,

(b) a reversible *n* - bit counter,

(c) a digital-analog converter having a plurality of inputs from a plurality of outputs of said counter and effective to generate a second analog signal,

(d) means for comparing said first analog signal with said second analog signal,

(e) means for stepping said counter forward step by step in a first counting direction when the second analog signal is smaller than the first and in an opposite counting direction when the second analog signal is greater than the first,

(f) a decoder having a plurality of inputs respectively connected to all but one of said plurality of outputs of said counter, said counter having a first bit output which is not connected to said decoder,

(g) said decoder being formed as an *n*-1 to 2^{n-1} decoder, and having 2^{n-1} outputs, wherein *n* represents the number of bits to be considered,

(h) a plurality of resistors whose resistance values are graduated in a specific ratio to one another,

(i) said resistors having inputs each respectively connected to one of the respective outputs of said decoder, and

(j) means connecting outputs of all of said resistors to a common connection point at which said control output signal is present.

4,117,500

AUTOMATIC EXPOSURE CONTROL APPARATUS IN A CAMERA

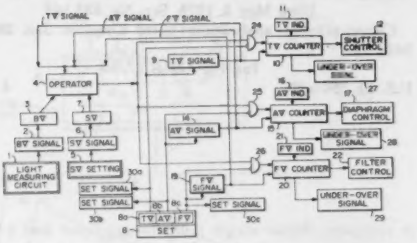
Toshihiro Kondo, Chofu, Japan, assignor to Toshihiro Kondo, Tokyo and Fuji Photo Film Co., Ltd., Minami-ashigara,, Japan, Minami-ashigara, both of

Filed Sep. 23, 1976, Ser. No. 725,995

Claims priority, application Japan, Sep. 23, 1975, 50-115069

Int. Cl.[2] G03B 7/08

U.S. Cl. 354—23 D **4 Claims**



1. An automatic exposure control apparatus in a photographic camera for automatic setting of exposure parameters wherein exposure is controlled by the selection of three exposure parameters, namely, diaphragm aperture, shutter speed and filter transmittance, said exposure control apparatus comprising:

light measuring means for measuring the intensity of light incident upon an object and producing an illumination intensity signal;

film-speed setting means for producing a film-speed setting signal which indicates the speed of the film loaded in the camera;

diaphragm aperture setting means for producing a diaphragm aperture setting signal indicative of the diaphragm aperture when the same is manually set;

shutter speed setting means for producing a shutter speed setting signal indicative of the shutter speed when the same is manually set;

filter transmittance setting means for producing a filter transmittance setting signal indicative of the filter transmittance when the same is manually set;

first pulse signal supply means connected to said light measuring means and producing a number of pulses proportional to said illumination intensity signal;

second pulse signal supply means connected to said film-speed setting means and producing a number of pulses proportional to said film-speed setting signal;

third pulse signal supply means connected to said shutter speed setting means and producing a number of pulses proportional to said shutter speed setting signal;

fouth pulse signal supply means connected to said diaphragm aperture setting means and producing a number of pulses proportional to said diaphragm aperture setting signal;

fifth pulse signal supply means connected to said filter transmittance setting means and producing a number of pulses proportional to said filter transmittance setting signal;

diaphragm aperture control means for adjusting the diaphragm aperture to the value set on said diaphragm aperture setting means;

shutter speed control means for adjusting the shutter speed to the value set on said shutter speed setting means;

filter transmittance control means for adjusting the filter to the value set on said filter transmittance setting means; and

arithmetic means responsive to the output pulse signals of any two of said third, fourth and fifth pulse signal supply means and the output pulse signals of said first and second pulse signal supply means;

whereby any two of the diaphragm aperture setting means, the shutter speed setting means and the filter transmittance setting means are preset at desired settings and the remaining one is automatically controlled in accordance with the output of said arithmetic means.

4,117,501

BOX CAMERA AND PHOTOGRAPHIC KIT

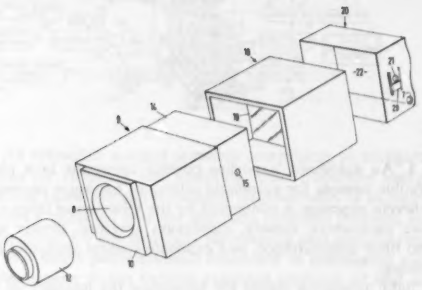
John Alexander Peck, Houghton Nr. Stockbridge, England, assignor to Radionic Products Limited, Bristol, England

Filed May 4, 1976, Ser. No. 683,163

Claims priority, application United Kingdom, Jan. 29, 1976, 3438/76

Int. Cl.² G03B *17/50*

U.S. Cl. 354—89 **4 Claims**



1. A box camera comprising:

(a) a front body portion which has an exposure aperture,

(b) a first rear body portion which incorporates a viewing screen and is detachably mounted to the front body portion to form a simulated box camera to permit focussing of the camera, and

(c) a second rear body portion detachably mounted to the front body portion when the first rear body portion is detached from the front body portion to form a box camera for taking a photograph and incorporates a support for a positive photographic paper during exposure and during subsequent processing of the paper within the camera, the second rear body portion being adapted to form a processing well which contains the supported paper,

(d) the second rear body portion having a normally closed opening through which, when open liquid chemicals may be introduced into the camera to process an exposed photographic paper in the well and normally closed outlet through which, when open liquid chemicals may be drained from the camera.

4,117,502

CAMERA PROVIDED WITH RECORDER FOR LIGHT OF LIGHT SOURCE

Susumu Takeda, Hino, and Kiyoaki Hazama, Hachiosi, both of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Jul. 7, 1977, Ser. No. 813,523

Claims priority, application Japan, Jul. 14, 1976, 51-83808

Int. Cl.² G03B *17/24*

U.S. Cl. 354—106 **5 Claims**

1. A camera comprising:

a. objective lens means comprising a plurality of lenses,

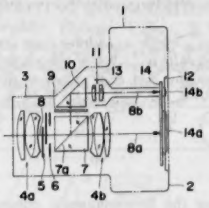
b. an exposure control means for controlling the amount of image-forming light,

c. a support means for supporting a photosensitive material on a focal plane,

d. light diffusion means,

e. means for directing light passed through at least a part of said objective lens means to said light diffusion means, and

f. optical guide means for guiding the light from said light diffusion means to the photosensitive material, wherein the light incident upon the photosensitive material, which



light passed through said light diffusion means, is regulated in relaton to the control by said exposure control means.

4,117,503

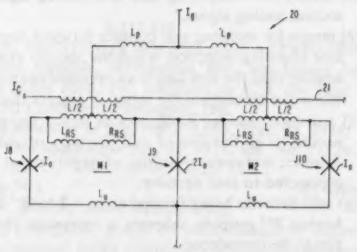
JOSEPHSON INTERFEROMETER STRUCTURE WHICH SUPPRESSES RESONANCES

Hans Helmut Zappe, Granite Springs, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1977, Ser. No. 811,753

Int. Cl.² H01L *39/22*

U.S. Cl. 357—5 **16 Claims**



1. An interferometer comprising:

at least a pair of junctions capable of carrying Josephson current and at least a main inductance disposed between said at least a pair of junctions, and,

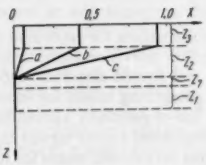
means disposed in parallel with said main inductance for suppressing resonance peaks.

4,117,504

HETEROGENEOUS SEMICONDUCTOR STRUCTURE WITH COMPOSITION GRADIENT AND METHOD FOR PRODUCING SAME

Vadim Nikolaevich Maslov, ulitsa Alexeya Tolstogo, 22/2, kv. 101; Oleg Evgenievich Korobov, Golikovsky pereulok, 13, kv. 6; Alla Naumovna Lupacheva, Profsojuznaya ulitsa, 38/10, korpus 1, kv. 101; Alexandr Nikolaevich Vlasov, Gospitalnaya ploschad, 3a, korpus 1, kv. 11, all of Moscow; Viktor Vasilievich Myasoedov, prospekt Junykh Lenintsev, 76, kv. 8, Podolsk Moskovskoi oblasti; Ellin Petrovich Bochkarev, Khlebozavodskoi proezd, 3, kv. 16, Moscow; Felix Aronovich Gimelfarb, 13 Parkovaya, 25, korpus 1, kv. 31, Moscow; Izidor Karlovich Bronshtein, Ambulatorny pereulok, 17, kv. 48, Moscow; Natalya Ivanovna Lukicheva, Kashirskoe shosse, 98, korpus 2, kv. 254, Moscow; Evgeny Vladimirovich Sinitsyn, ulitsa Ostrovityanova, 21, kv. 73, Moscow; Jury Varnavovich Sokurenko, ulitsa Ostrovityanova, 21, kv. 94, Moscow; Elena Sergeevna Jurova, Frunzenskaya naberezhnaya, 38, kv. 51, Moscow; Elena Mikhailovna Kistova, ulitsa 26 Bakinskikh komissarov, 3, korpus 3, kv. 339, Moscow; Marina Andreevna Konstantinova, ulitsa Aviamotornaya, 4, korpus 5, kv. 338, Moscow, and Veniamin Mikhailovich Samaginov, ulitsa Udaltsova, 4, kv. 145, Moscow, all of U.S.S.R.

Filed Aug. 6, 1976, Ser. No. 712,324
Int. Cl.[2] H01L *29/161*
U.S. Cl. 357—16 4 Claims



1. A heterogeneous semiconductor structure with a composition gradient, comprising:

a monocrystalline substrate;

a main semiconductor layer which is doped solid solution of AB_xC_{1-x} of semiconductor components AB and AC, where x, limited by the ratio $0<x<1$, designates molar fractions of the AB component in said solid solution of AB_xC_{1-x} of said main layer having a composition gradient with a constant direction parallel with the main axis selected on the surface of said substance, the composition of said main layer changing continuously along said main axis from the portion of said layer corresponding to a maximum content of the AB component of said solid solution to the portion of said main layer corresponding to a maximum content of said AC component of said solid solution;

a transition semiconductor layer of doped solid solution of AB_xC_{1-x}, arranged between said substrate and said main semiconductor layer, the composition of said transition layer changing continuously along said main axis from a portion of said transition layer having a maximum content of the AB component to a portion corresponding to a maximum content of the AC component in the direction parallel to the substrate surface and also in the direction perpendicular to said surface of said substrate, the composition of said transition layer changing from said composition of said main layer on the boundary with said transition layer to a composition with a maximum content of said AB component on the boundary with said substrate the component of said transistion layer thus varying continously in two directions;

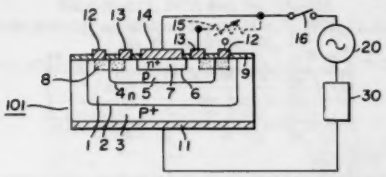
said monocrystalline substrate being of a material with crystallographic properties similar to those of said AB component of said solid solution.

4,117,505

THYRISTOR WITH HEAT SENSITIVE SWITCHING CHARACTERISTICS

Josuke Nakata, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 19, 1976, Ser. No. 743,356
Int. Cl.[2] H01L *23/56, 29/66, 29/74*
U.S. Cl. 357—28 7 Claims



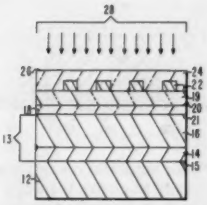
1. In a heat sensitive switching device which comprises at least three pn junctions between a pair of main electrodes to change from the OFF state to the ON state under rising temperature in at least one quadrant of the main voltage - main current characteristic curve, one of the pn junctions being a forward blocking junction which causes the reverse bias in the OFF state, an improvement characterized by forming a region for shortening the lifetime of carriers at a part of the forward blocking junction.

4,117,506

AMORPHOUS SILICON PHOTOVOLTAIC DEVICE HAVING AN INSULATING LAYER

David Emil Carlson, Yardley, Pa., and Christopher Roman Wronski, Princeton, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Jul. 28, 1977, Ser. No. 819,936
Int. Cl.[2] H01L *27/14*
U.S. Cl. 357—30 8 Claims



1. A photovoltaic semiconductor device comprising:

a body of amorphous silicon fabricated by a glow discharge in silane, SiH_4;

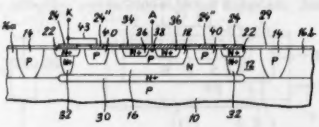
a layer of an electrically insulating material on a surface of said body, said insulating layer being of a thickness such that charge carriers are capable of tunneling through said layer; and

a metallic layer on a surface of said insulating layer opposite said body.

4,117,507
DIODE FORMED IN INTEGRATED-CIRCUIT STRUCTURE

Bruno Pacor, Cornaredo (Milan), Italy, assignor to SGS-ATES Componeti Elettronici S.p.A., Agrate Brianaza (Milan), Italy

Filed Jun. 20, 1977, Ser. No. 808,369
Claims priority, application Italy, Jun. 22, 1976, 24531 A/76; Jun. 25, 1976, 24696 A/76
Int. Cl.² H01L 27/04
U.S. Cl. 357—48 10 Claims

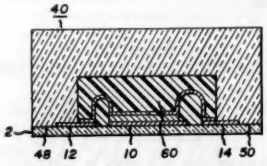


1. An integrated semiconductor structure comprising:
a substrate of one conductivity type;
an overlying layer of the opposite conductivity type on said substrate;
a barrier of said one conductivity type extending to said substrate from a remote surface of said overlying layer and bounding an isolated region of said overlying layer constituting a first diode portion;
an intermediate zone of said one conductivity type in said region separated from said substrate constituting a second diode portion adjacent said remote surface;
a low-resistance zone of said opposite conductivity type spacedly interposed within said region between said intermediate zone and said barrier next to said remote surface;
a first metallic coating at said remote surface on said intermediate zone;
a second metallic coating at said remote surface on said low-resistance zone; and
a low-resistance section of said opposite conductivity type embedded in said intermediate zone adjacent said remote surface, said section occupying the major part of the area contacted by said first metallic coating.

4,117,508
PRESSURIZABLE SEMICONDUCTOR PELLET ASSEMBLY

Paul W. Koenig, Clyde, N.Y., assignor to General Electric Company, Auburn, N.Y.

Filed Mar. 21, 1977, Ser. No. 779,327
Int. Cl.² H01L 23/02, 23/28, 23/42
U.S. Cl. 357—81 5 Claims

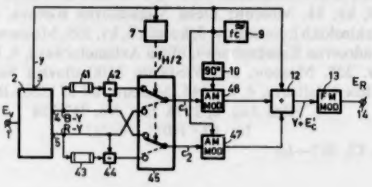


1. A semiconductor apparatus comprising:
a plate of electrically insulative thermally conductive material having a bottom major face adapted to be pressed in heat-transferring relation against a substrate heatsink, said plate having a top major face provided with a plurality of metallized contacts;
a semiconductor body having a bottom major face affixed to one of said contacts and connected to leads extending between contact regions on the top major face of said body and others of said contacts on said plate; and
a one-piece insulative bridge carried by said plate including upstanding spaced legs connected by an integral cross member, said legs terminating at their bottom ends in feet secured to said plate and said cross member spanning said body in upwardly spaced relation to said body and said leads whereby the bottom face of said plate may be pressed against said heatsink by a force applied to said bridge without application of any pressure to said body.

4,117,509
COLOR TELEVISION SYSTEM FOR RECORDING LINE SEQUENTIAL SIGNALS WITH 90° PHASE SHIFT

Eeltje de Boer, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 12, 1976, Ser. No. 741,238
Claims priority, application Netherlands, Sep. 20, 1976, 7610400
Int. Cl.² H04N 9/38, 5/79
U.S. Cl. 358—4 3 Claims



1. A colour television system for recording a colour television signal, which colour television signal contains the colour information as first and second amplitude modulated colour signals, said system comprising means for recording said two colour signals in a line-sequentially alternating fashion, the phase angle of the modulated colour signals being 90° shifted during consecutive line periods and means for recording simultaneously with the first and the second colour signals a first and a second difference signal respectively, the first colour signal together with the first difference signal as well as the second colour signal together with the second difference signal being quadrature modulated, the first difference signal comprising the difference between the value of one of the two signals during a selected line period and the value of this colour signal at the corresponding instant during the preceding or the next line period, the second difference signal comprising the difference between the value of the other colour signal during a selected line period and the value of said other colour signal at the corresponding instant during the preceding or the next line period.

4,117,510
SOLID STATE COLOR IMAGING APPARATUS

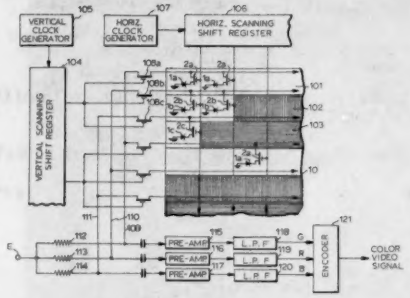
Yoshio Ohta, Hirakata; Toshiro Matsuura, Moriguchi, and Ryuhei Nakabe, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Sep. 23, 1975, Ser. No. 615,885
Claims priority, application Japan, Sep. 25, 1974, 49-110871; Sep. 25, 1974, 49-110872; Sep. 25, 1974, 49-110873; Nov. 12, 1974, 49-130839
Int. Cl.² H04N 9/07
U.S. Cl. 358—44 15 Claims

1. A solid state color imaging apparatus for producing a color video signal representing an optical image of an object, said apparatus comprising:
photosensitive means which consists of a plurality of photosensitive elements which are arranged substantially in line both in the horizontal and vertical scanning directions and color filter means consisting of a plurality of sets of color filter strips each of which overlies at least one line of said photosensitive elements in a horizontal scanning direction for producing a set of line signals, which sets are arranged in a repeating sequence in a vertical scanning direction;

first charge transfer means coupled to said photosensitive means for shifting charge signals from a set of photosensitive elements under one set of color filter strips at a time in a horizontal blanking period by vertical transfer clock signals for producing a set of line signals, which charge signals have been transferred thereto from said photosensitive means in a vertical blanking period;

second charge transfer means coupled to said first charge transfer means having a set of transfer channels for transferring out said charge signals one set at a time, which



charge signals have been shifted thereinto from said first transfer means in said horizontal blanking period, in a horizontal scanning period by horizontal transfer clock signals for producing a set of output signals which correspond to said set of line signals; and

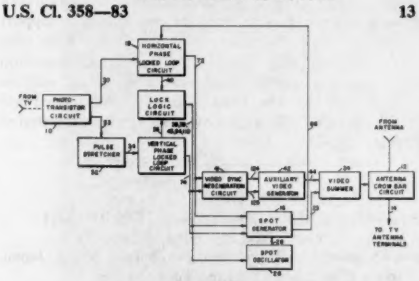
processing circuit means coupled to said second charge transfer means for responding to said set of output signals which are derived through said set of transfer channels of said second charge transfer means for producing the color video signal.

4,117,511

UNIVERSAL TELEVISION INTERFACE AND SYNC GENERATOR THEREFOR

Ralph H. Baer, Manchester, and Leonard D. Cope, Merrimack, both of N.H., assignors to Sanders Associates, Inc., Nashua, N.H.

Filed Jul. 21, 1977, Ser. No. 817,642
Int. Cl.[2] H04N *5/06, 5/50*
U.S. Cl. 358—83 **13 Claims**



1. Apparatus for generating synchronization signals from an ongoing program received at a television receiver from a TV r.f. signal transmission source, comprising:

means for generating a substantially white area on the screen of the television receiver;

means optically coupled to the screen of the television receiver and responsive to a portion of the raster in synchronism with the ongoing program; and

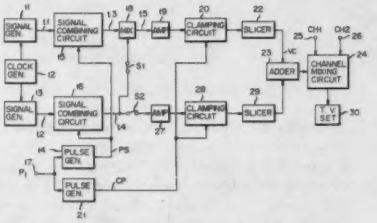
means coupled to said optically coupled means responsive for generating horizontal and vertical synchronization signals in synchronism with the horizontal and vertical synchronization signals of the ongoing program.

4,117,512

APPARATUS FOR PROVIDING A VIDEO MONTAGE TO A TELEVISION PICTURE IMAGE

Kazuhiko Miyake, and Bunkichi Yamada, both of Kawasaki, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Mar. 3, 1977, Ser. No. 774,122
Claims priority, application Japan, Mar. 5, 1976, 51/23137
Int. Cl.[2] H04N *5/22*
U.S. Cl. 358—183 **7 Claims**



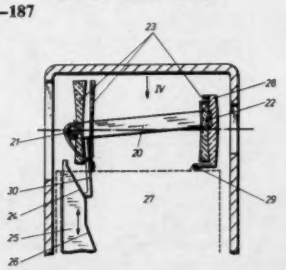
1. An apparatus for providing a video montage to a television picture image, comprising means for generating a fundamental wave signal for defining a boundary of picture images in a signal generated by combining a plurality of television signals, said fundamental wave signal having a predetermined portion set to a reference level; means for clamping the fundamental wave signal at a predetermined level utilizing the reference level of the fundamental wave signal; and means for slicing the clamped signal at upper and lower levels with the predetermined clamp level substantially at a mid-level to obtain a control signal for use in synthesizing a plurality of television signals by the control signal.

4,117,513

CAMERA HAVING A TELESCOPING HOUSING

Karl-Günter Behr, and Helmut Knapp, both of Biebertal, Fed. Rep. of Germany, assignors to Minox GmbH, Giessen, Fed. Rep. of Germany

Filed Nov. 1, 1976, Ser. No. 737,428
Claims priority, application Fed. Rep. of Germany, Oct. 31, 1975, 2548768
Int. Cl.[2] G03B *17/04*
U.S. Cl. 354—187 **10 Claims**



1. A camera comprising a telescoping housing having a housing part displaceable between telescoped and extended positions, an optical viewfinder in said housing, a pivotable means for indicating data in said view finder, and means operatively connecting said indicating means to said displaceable housing part for an additional pivoting of said indicating means

upon displacing said displaceable housing part to the telescoped position.

4,117,514

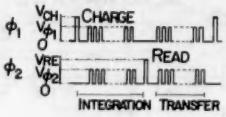
SOLID STATE IMAGING DEVICE

Yasuaki Terui, Neyagawa, and Masaru Yoshino, Kobe, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Feb. 14, 1977, Ser. No. 768,190

Int. Cl.[2] H04N *3/14;* **H01L** *29/78;* **G11C** *19/28, 1/40*

U.S. Cl. 358—213 **9 Claims**



9. A solid state imaging device for converting an optical image to an electrical signal comprising:

a photo-sensing means for accumulating a charge signal corresponding to the optical image for a given time period;

a charge transfer means connected to said photo-sensing means;

a switching means connected between said photo-sensing means and said charge transfer means; and

a clock line means connected to the control electrodes of said switching means and said charge transfer means for applying a control pulse and a clock signal to said switching means and said charge transfer means, said control pulse being followed by said clock signal and having a greater amplitude than said clock signal, said switching means being turned on in response to said control pulse to read the charge signal from said photo-sensing means into said charge transfer means, and said charge transfer means being responsive to said clock signal to transfer the charge signal to an output circuit means.

4,117,515

TELEVISION CAMERA HAVING SIGNAL ELECTRODE STRIPS

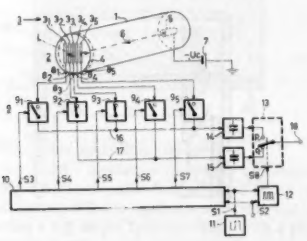
Marino Giuseppe Carasso; Leendert Johan van de Polder, and Sing Liong Tan, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 16, 1977, Ser. No. 769,034

Claims priority, application Netherlands, Dec. 24, 1976, 7614384

Int. Cl.[2] H04N *5/30, 9/07*

U.S. Cl. 358—217 **13 Claims**



1. A television camera comprising a pick up tube having an electron gun means for generating a scanning electron beam, a target plate including a photosensitive layer to be scanned by said beam and a signal electrode having a plurality of separate electrically conducting strips, and means for deflecting said beam for effecting line scanning transversely across successive ones of said strips; a switching circuit including a plurality of switches having inputs coupled to said strips respectively, control inputs, and outputs, successive outputs being alternately coupled in at least two groups to at least two output leads; and a first switching signal generator means coupled to said control inputs for providing that prior to a line scan said strips are coupled to a reference potential through said switching circuit and that after a scan of a strip by said beam the respective switch and at least one switch coupled to an adjacent strip and a different output lead are simultaneously closed to pass information to the respective switch outputs.

4,117,516

DEFLECTION YOKE

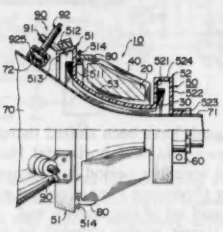
Yukihiko Yasuhara, Kawasaki, Japan, assignor to Denki Onkyo Co., Ltd., Tokyo, Japan

Filed Dec. 22, 1976, Ser. No. 753,366

Claims priority, application Japan, Dec. 24, 1975, 50-176169

Int. Cl.[2] H04M *5/64*

U.S. Cl. 358—248 **8 Claims**



1. In a deflection yoke comprising an annular core, a horizontal deflection coil of a saddle configuration, a vertical deflection coil having a conductor extending along the inside of the core, a coil separator interposed between the both coils having a recess in its front end and having a plurality of tongues at its rear end, the recess being defined by a radially outwardly extending wall and a peripheral wall, the tongues being adapted to be disposed around the neck of a cathode ray tube, and a clamping band for clamping the tongues against the neck; the improvement which comprises at least three positioning units disposed adjacent to the front end of the coil separator at substantially uniform spacing around the periphery thereof, each of the positioning units comprising a support plate having a threaded bore which extends toward the tube wall and an adjusting bolt means having a threaded portion threadably engaging the threaded bore and a head portion directly contacting the tube, the bolt means being turned into contact with the tube wall to thereby support a front portion of the deflection yoke.

4,117,517

DATA COMPRESSION SYSTEM FOR BINARY FACSIMILE SIGNALS

Takamasa Shintani, and Koyo Nagasawa, both of Ebina, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Feb. 24, 1977, Ser. No. 771,490

Claims priority, application Japan, Feb. 27, 1976, 51-19951

Int. Cl.[2] H04N *1/40, 7/12*

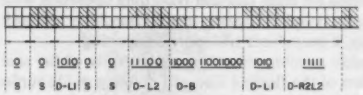
U.S. Cl. 358—260 **5 Claims**

1. A method of compression coding for binary scanning signals in a facsimile system, comprising the steps of:

(a) assigning different binary codes to each one of a plurality of predetermined modes of possible, commonly occurring bit pattern variations between the binary bit patterns of adjacent scan lines,

(b) comparing the binary bit patterns of adjacent scan lines to determine which modes of variation are present in a

first scan line with respect to a second, adjacent scan line, and



(c) assembling the binary codes of the determined modes to thereby constitute a composite compressed code bit sequence representing said first scan line.

4,117,518

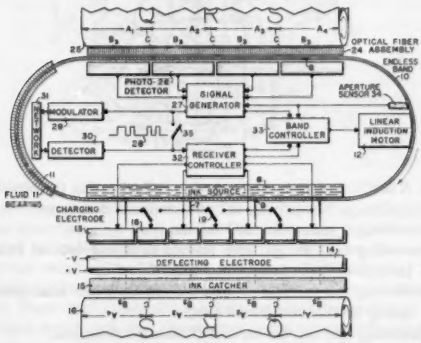
INK DROP FACSIMILE SYSTEM

Stephen F. Skala, 3839 S. Wenonah, Berwyn, Ill. 60402

Continuation-in-part of Ser. No. 608,089, Aug. 27, 1975, abandoned, and Ser. No. 421,425, Dec. 3, 1973, abandoned. This application Nov. 11, 1976, Ser. No. 740,805

Int. Cl.[2] H04N *1/24*

U.S. Cl. 358—296 **5 Claims**



1. A facsimile receiver and transmitter assembly including

a signal responsive printer in said assembly for printing a graphic pattern on a receiving surface in response to signals,

a scanner in said assembly for converting a graphic pattern on a document to signals for controlling printing of another signal responsive printer remote from said assembly,

an endless band having a plurality of uniformly spaced openings,

means to move said band through said printer in said assembly and through said scanner,

means to form modulated ink drop columns from ink passing through at least some of said openings to deposit drops in said columns in a graphic pattern on a receiving surface,

a plurality of photodetectors corresponding to at least some of the openings in the endless band,

means to project an image of said document through at least some of said openings to said photodetectors, and

means to convert output of said photodetectors to a sequential signal for controlling printing of said remote printer.

4,117,519

GUIDE DRUM APPARATUS IN A MAGNETIC RECORDING AND/OR REPRODUCING APPARATUS

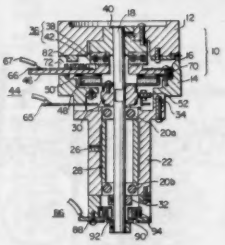
Tadao Shioyama, Katano, and Minoru Koda, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 27, 1977, Ser. No. 846,491

Claims priority, application Japan, Oct. 27, 1976, 51-129665

Int. Cl.[2] G11B *21/04, 21/18, 5/45*

U.S. Cl. 360—84 **12 Claims**



1. A guide drum apparatus in a magnetic recording and/or reproducing apparatus, comprising:

a rotary center shaft;

a hollow cylindrical rotary drum coaxially fixed to said center shaft and having a cylindrical outer surface;

a rotary head fixedly supported to rotate with said center shaft at a hollow cylindrical outer surface of said rotary drum;

a hollow cylindrical stationary drum coaxially and rotatably supporting said center shaft and having a cylindrical outer surface, said cylindrical outer surfaces of said rotary drum and said stationary drum being positioned on a same cylindrical surface and spaced from each other by a gap, said rotary head being positioned at said gap, and the hollows of said rotary drum and said stationary drum facing each other to thereby form a bore;

a stator plate of a magnetic material fixed to said stationary drum and having a major plane surface perpendicular to the axis of said center shaft;

stationary armature windings fixed to said major plane surface of said stator plate and equidistantly positioned on a circle defined on said stator plate, the center of said circle coinciding with the axis of said center shaft;

a rotary winding, for a rotary transformer, fixedly supported by said center shaft at a side facing a surface of said stator plate opposite to said major plane surface of said stator plate, and electrically connected to said rotary head;

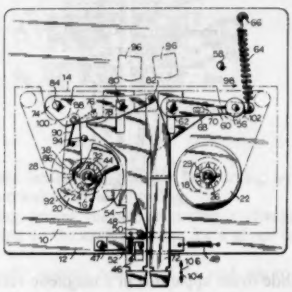
a stationary winding, for said rotary transformer, fixedly supported by said stationary drum at a position between said rotary winding and the surface of said stator plate opposite to said major plane surface of said stator plate, said stator plate thus functioning also as a shield plate for reducing magnetic coupling between said rotary transformer and said armature windings and also between said rotary head and said armature windings; and

rotary magnets fixedly supported by said center shaft and equidistantly spaced on a circle which is defined on a plane parallel to and facing said major plane surface of said stator plate and which has a center coinciding with the axis of said center shaft, so that said armature windings face said rotary magnets to cause said rotary magnets to rotate by the magnetic fluxes produced from said armature windings, wherein all of said rotary transformer, said armature windings and said rotary magnets are contained in said bore.

4,117,520
MAGNETIC TAPE CARTRIDGE RECORDING APPARATUS WITH MANUALLY ACTUATED TAPE THREADING AND TAPE REWIND

Jirou Kajino, Neyagawa, and Kazumi Iwasaki, Moriguchi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed May 13, 1977, Ser. No. 796,828
Claims priority, application Japan, May 19, 1976, 51-58402
Int. Cl.[2] G11B *15/66*
U.S. Cl. 360—95 **5 Claims**

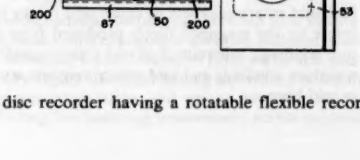


1. A magnetic tape recording and/or reproducing apparatus for recording and/or reproducing signals on a magnetic tape wound on reels contained in a tape cartridge, said apparatus comprising: a pair of reel drive turntables engageable with said reels for rotating said reels; tape moving means connected to said drive turntables for moving said magnetic tape at a constant speed; operation control means connected to said tape moving means for controlling the operation of said tape moving means; a magnetic head for recording and/or reproducing signals on said magnetic tape and spaced laterally away from the normal path of said tape between the reels in said tape cartridge when said tape cartridge is in said apparatus; tape drawing means movable from an inoperative position to an operative position for drawing said magnetic tape out of said tape cartridge and against said magnetic head; and turntable rotating means frictionally connected to one of said reel drive turntables and driven by said drawing means in its movement from the operative position to the inoperative position for rotating one of said reel drive turntables in a direction to wind the magnetic tape drawn out of the cartridge by said tape driving means onto said one reel.

4,117,521
FLEXIBLE DISC RECORDER WITH SKEWED TRANSDUCER TRANSPORT

Boyd Lehman Stratton, Woodside, and William E. Nichols, San Jose, both of Calif., assignors to Arvin Industries, Inc., Columbus, Ind.

Filed Nov. 4, 1976, Ser. No. 738,673
Int. Cl.[2] G11B *21/24*
U.S. Cl. 360—99 **5 Claims**



1. In a disc recorder having a rotatable flexible recording disc and a transducer radially movable with respect to the disc, the transducer defining a gap extending radially of the disc and positioned for most efficient recording operation with the disc in closely coupled relation to the transducer on both sides of the gap, a transducer transport comprising:

a guide member extending transversely of the axis of rotation of the flexible disc and defining guide surfaces,

transducer carriage means for mounting the transducer,

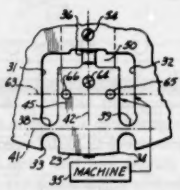
means for moving said carriage means along said guide member in contact with said guide surfaces such that the transducer is moved radially with respect to the rotating recording disc, and

means for positioning said guide surfaces such that said transducer carriage means is progressively tilted as said carriage means is moved along said guide surfaces toward the periphery of said disk such that the desired closely coupled relation between the transducer and the disc is maintained.

4,117,522
ISTHMIAN PRECISION ADJUSTABLE MOUNT FOR MAGNET HEAD ASSEMBLY

William C. Whittle, LaVerne, and Joel E. Zneimer, Arcadia, both of Calif., assignors to Bell & Howell Company, Chicago, Ill.

Filed Jan. 17, 1977, Ser. No. 759,926
Int. Cl.[2] G11B *21/24*
U.S. Cl. 360—109 **54 Claims**



1. A method of mounting a device and adjusting the position of said device, comprising in combination the steps of:

providing a mount for said device;

providing said mount with spaced first and second isthmi located on a predetermined axis;

rendering the portion of said mount between said spaced isthmi tiltable about said axis;

mounting said device on said tiltable portion; and

adjusting the position of said device by tilting said portion about said axis.

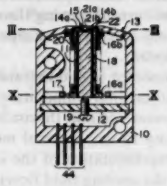
4,117,523
MAGNETIC SENSOR HAVING A HOLLOW HOUSING SEALED WITH A SHIELD CAP

Noboru Masuda, Kawaguchi; Yu Nishino, Yokohama, and Hiroaki Kase, Machida, all of Japan, assignors to Denki Onkyo Co., Ltd., Tokyo, Japan

Filed Feb. 10, 1977, Ser. No. 767,311
Claims priority, application Japan, Feb. 10, 1976, 51-13414; Feb. 10, 1976, 51-14270[U]
Int. Cl.[2] G11B *5/22, 5/20, 5/10*
U.S. Cl. 360—110 **13 Claims**

1. A magnetic sensor comprising a hollow housing, a through opening formed in the housing, a shield cap which seals the through opening, flux producing means received within the housing and having its one end which is formed as a magnetic pole located within the region of the through opening within the housing, a magnetoelectric transducer element

secured to the pole face of the flux producing means which is located within the through opening, and connection means for



connecting electrical terminals within the housing to the exterior thereof.

4,117,524

CURRENT-LIMITING DEVICES

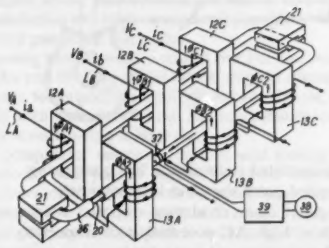
Kenneth Charles Parton, Sutton Coldfield; Anthony Derek Appleton, and Trevor Carlisle Bartram, both of Newcastle upon Tyne, all of England, assignors to Reyrolle Parsons Limited, Newcastle upon Tyne, England

Filed Oct. 1, 1976, Ser. No. 728,837

Claims priority, application United Kingdom, Oct. 3, 1975, 40628/75

Int. Cl.[2] H02H *3/08*

U.S. Cl. 361—19 **13 Claims**



1. A current-limiting device for an alternating current system comprising for each phase of the system at least two iron-cored saturable reactors, each reactor having an alternating current winding and a direct current superconducting bias winding, the bias winding being common to the reactors of that phase and establishing a bias level of saturation in the reactor cores such that the reactor cores are maintained saturated under full load alternating current conditions, said bias winding having a surrounding screen of electrically-conductive material shielding the direct current bias winding against alternating magnetic flux, and the alternating current windings of each phase being so arranged and connected that under full load conditions a change in the level of saturation in any one reactor core relative to the bias level due to the bias winding is accompanied by a compensating change in saturation level in another core or cores, current limiting occurring when on each half-cycle one of the cores is forced out of saturation.

4,117,525

OVERPRESSURE PROTECTION FOR VAPORIZATION COOLED ELECTRICAL APPARATUS

Curtis L. Moore, Hermitage, Pa., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Sep. 9, 1977, Ser. No. 831,716

Int. Cl.[2] H02H *7/04*

U.S. Cl. 361—37 **11 Claims**

1. Electrical inductive apparatus comprising:

a sealed housing;

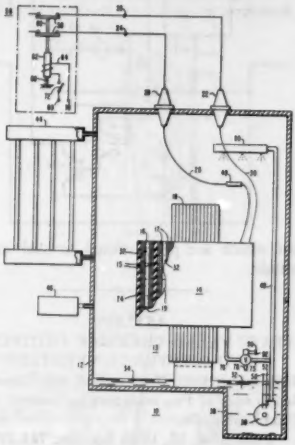
a magnetic core disposed within said sealed housing;

an electrical winding disposed in inductive relation with said magnetic core;

means for connecting said electrical winding to a source of electrical potential;

a dielectric fluid, vaporizable within the normal operating temperature range of said electrical inductive apparatus, disposed within said sealed housing;

means, including an electrically operated pump, for supplying said dielectric fluid to said winding;



means for connecting said pump to a source of electrical potential; and

means for detecting when the pressure in said sealed housing reaches a predetermined value, said means for connecting said pump to a source of electrical potential being responsive to said pressure detecting means to disconnect said pump from the source of power independent from said means for connecting said winding to a source of electrical potential when the pressure within said sealed housing reaches the predetermined value.

4,117,526

UNDERVOLTAGE PROTECTION DEVICE

James T. Bates, Elgin, Ill., assignor to Tri-Venture, Lake in the Hill, Ill.

Continuation-in-part of Ser. No. 712,380, Aug. 6, 1976, abandoned. This application Jun. 22, 1977, Ser. No. 808,730

Int. Cl.[2] H02H *3/24*

U.S. Cl. 361—92 **14 Claims**

1. A voltage sensitive under voltage protection device for coupling to a source and a load comprising:

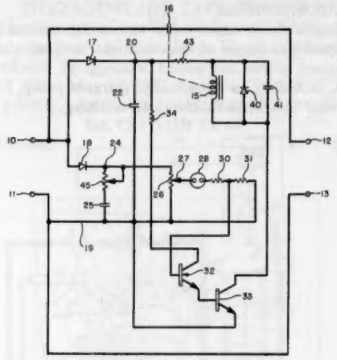
sensing means having an input and output, said means operative to sense voltage magnitudes of said source at the input thereof and producing voltages at the output thereof having magnitudes proportional to said source voltage magnitude;

switching means operative to couple and de-couple said source from said load;

voltage reference means responsive to said sensing means for operating said switching means, said reference means having preselected and substantially specific conduction and non-conduction voltage characteristics substantially unaffected over a wide range of ambient temperatures and responsive to the voltage magnitudes of the output of said sensing means such that source voltage magnitudes greater and less than a predetermined level operate said switching means upon conduction and non-conduction of said referenced means; and

said sensing means including means to selectively produce a plurality of separately adjustable direct and alternating

voltage components effecting a plurality of composite direct and alternating voltage magnitudes at the output



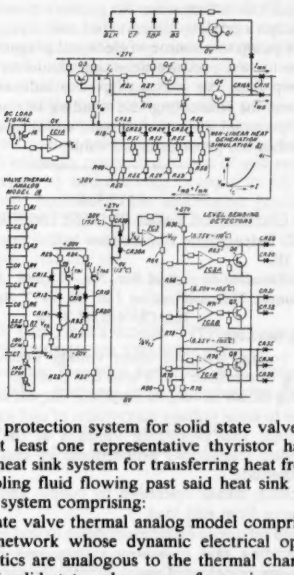
thereof which are proportional to said source voltage magnitude.

4,117,527

SOLID STATE VALVE THERMAL PROTECTION FOR HVDC POWER CONVERTERS

Donald Monroe Demarest, Wallingford, and Edgar Frank Chandler, Media, both of Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed Mar. 25, 1977, Ser. No. 781,279
Int. Cl.[2] H02H *5/04, 7/14*
U.S. Cl. 361—103 **21 Claims**



1. A thermal protection system for solid state valve means that includes at least one representative thyristor having a junction and a heat sink system for transferring heat from said junction to cooling fluid flowing past said heat sink system, said protection system comprising:

(a) a solid state valve thermal analog model comprising an electrical network whose dynamic electrical operating characteristics are analogous to the thermal characteristics of said solid state valve means for a given value of instantaneous D.C. load current supplied through said solid state valve means, which thermal characteristics include the heat transfer to cooling fluid capability characteristics of said representative thyristor including its heat sink system,

(b) means for deriving a first electrical signal representative of the value of the D.C. load current,

(c) D.C. current to heat generation simulation network means responsive to said first electrical signal for deriving an output electrical power dissipation signal representative of the instantaneous value of the power dissipation within the junction of said representative thyristor for a given value of load current flowing through said junction,

(d) means for applying said power dissipation signal to said thermal analog model,

(e) output means connected to said thermal analog model for deriving an output junction temperature signal representative of the temperature of said thyristor junction, and

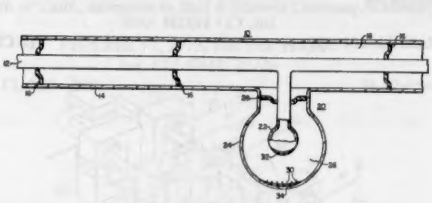
(f) means for applying to said thermal model an additional electrical signal representative of the instantaneous temperature value of the cooling fluid flowing over said valve means and said heat sink system in such a way that said output junction temperature signal is modified by said additional signal.

4,117,528

GAS-INSULATED TRANSMISSION LINES WITH DC VOLTAGE LIMITING MEANS

Philip C. Bolin, Northboro, Mass., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 28, 1977, Ser. No. 772,789
Int. Cl.[2] H02H *3/22, 7/22*
U.S. Cl. 361—120 **11 Claims**



1. A gas-insulated transmission line comprising:

an elongated outer sheath at low potential;

an elongated inner conductor disposed within said outer sheath at high AC potential with respect to said outer sheath;

an insulting gas disposed within said outer sheath and electrically insulating said inner conductor from said outer sheath;

means for insulatably supporting said inner conductor within said outer sheath;

a first electrode electrically connected to said inner conductor and extending radially outwardly therefrom;

a second electrode electrically connected to said outer sheath and extending radially outwardly therefrom, said first electrode being spaced-apart from, and enclosed within, said second electrode, said first and second electrodes being vertically disposed with said second electrode extending below said first electrode; and

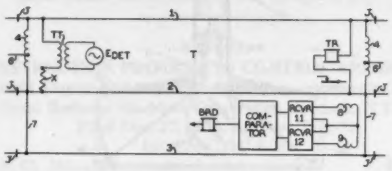
means, responsive to DC voltage on said first electrode, for discharging said DC voltage on said first electrode whenever said DC voltage exceeds a predetermined level ,

said DC voltage discharging means being spaced-apart from said first electrode whenever said DC voltage is less than said predetermined level and in electrical contact with said first electrode whenever said DC voltage exceeds said predetermined level, said high AC potential being inoperative to move said DC voltage discharing means into electrical contact with said first electrode, said DC voltage discharging means comprising a conducting particle intentionally disposed within said second electrode at the lowermost portion thereof, said particle traversing from said second electrode to said first electrode only when said DC voltage exceeds said predetermined level, said particle upon contacting said first electrode discharging said DC voltage.

4,117,529
BROKEN RAIL DETECTING TRACK CIRCUITS

Donald E. Stark, Mt. Lebanon; Anthony G. Ehrlich, Castle Shannon, both of Pa., and Bruno Guillaumin, Ville d'Avray, France, assignors to Westinghouse Air Brake Company, Swissvale, Pa.

Filed Mar. 23, 1977, Ser. No. 780,474
Int. Cl.[2] H01H *47/20*
U.S. Cl. 361—182 **19 Claims**



1. A circuit network for detecting broken rail in an insulated track section including two rails extending between the section ends and a length of another rail electrically coupled in parallel to at least a portion of one of said section rails, comprising in combination,

(a) a source of energy coupled to said section rails at one end for transmitting train detection current through said section rails,

(1) said train detection current dividing at substantially equal levels between said portion of said one rail and said other rail when normal rail conditions exist through said paralleled rail paths,

(b) sensing means coupled to said one rail and said other rail at the end of said parallel circuit portion distant from said source for producing a pair of voltage signals, one associated with each parallel rail and representative of the current level flowing in that rail,

(c) a comparator means coupled to said sensing means for receiving said pair of signals produced thereby and responsive only to substantially equal received signals for generating an output signal, and

(d) a registry means coupled to said comparator means and responsive to an output signal for registering the absence of any broken rail in said portion of said one rail and in said other rail, said registry means registering a broken rail condition when no output signal is received from said comparator means.

4,117,530
METER RECEPTACLE ASSEMBLY

Ronald H. Reed, Versailles; William C. Miracle, Winchester, both of Ky., and Dwain G. McMullin, Aiken, S.C., assignors to Square D Company, Park Ridge, Ill.

Filed Jun. 30, 1977, Ser. No. 811,509
Int. Cl.[2] H02B *9/00*
U.S. Cl. 361—365 **5 Claims**

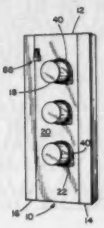
1. A meter receptacle assembly for a meter having a plurality of spaced contact blades extending outwardly from one surface of a flanged base at one end of a meter, said assembly including a cabinet, a plurality of socket receptacles, an insulating plate supported in said cabinet carrying said receptacles in spaced positions to receive a respective contact blade to establish a connection between one receptacle and a respective other receptacle, the improvement comprising:

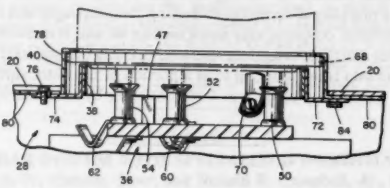
a ring secured to said cabinet and adapted to engage said one surface of said flanged base in response to the receipt of said contact blades by said receptacles,

a detachable annular collar removably attached to said cabinet and adapted to overlap said flanged base and ring, said collar having a radially outwardly extending flange wall at one axial end of said annular collar and a radially inwardly extending annular lip at the other axial end of said annular collar for abutment with said flanged base at a position spaced from said one surface, said flange wall extending radially outwardly of said collar and ring and having a passageway, said flange wall encircling said collar,

a latch having one end secured to said flange wall and another end axially spaced in a direction opposite said annular lip from said flange wall and extending in one angular direction,

a pair of circumferentially spaced tangs on said ring each extending radially outwardly of said ring, one of said tangs adapted to be received between said latch and said flange





wall in response to the engagement of said collar with said flanged base and rotation of said collar in said one direction to restrain axial movement of said collar,

a fastener extending from the other one of said tangs through said passageway in said flange wall to restrain rotational movement of said collar,

and an outer cover plate overlapping said flange wall and secured to said cabinet with said cover plate having a cutout passing said fastener to enable access to said fastener.

4,117,531
ELECTROLYTIC CAPACITOR

Sidney D. Ross; Franz S. Dunkl, both of Williamstown, and Manuel Finkelstein, North Adams, all of Mass., assignors to Sprague Electric Company, North Adams, Mass.

Filed May 25, 1977, Ser. No. 800,258
Int. Cl.[2] H01G *9/02*
U.S. Cl. 361—433 **10 Claims**

1. An electrolytic capacitor comprising a capacitance section having a plurality of electrodes, at least one being a valve-metal electrode having a dielectric layer on its surface, said section being impregnated with an electrolyte comprising a solvent selected from the group consisting of dimethylformamide, N-methylformamide, glycol, and glycol-methylcellosolve, and a solute consisting essentially of a compound selected from the group consisting of ammonium or amine salts of an amic acid selected from the group consisting of maleamic, succinamic, phthalamic, and hexahydrophthalamic acids.

4,117,532
LAMP SHADE CONSTRUCTION AND METHOD

Richard Arbib, New York, N.Y., assignor to Richard Arbib Company, Inc., New York, N.Y.

Filed Dec. 10, 1976, Ser. No. 749,660
Int. Cl.[2] F21V *1/04*
U.S. Cl. 362—358 8 Claims

1. A lampshade construction comprising at least one circumferential framework having an inner surface, an outer surface and a plurality of openings extending therethrough, and a layer of material covering said inner surface of said framework and having portions extending into said openings to seal said material to said framework, at least a portion of the outer surface of said framework being free from covering by said material.

4,117,533
MODULAR LIGHTING SYSTEM

Allan T. Hagelthorn, 223 E. 78th St., New York, N.Y. 10021

Filed Feb. 18, 1977, Ser. No. 770,104
Int. Cl.[2] F21L *7/00*
U.S. Cl. 362—367 10 Claims

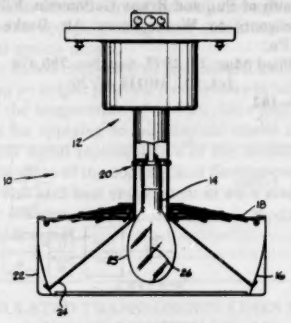
1. A modular lighting system, comprising, in combination: an assembly including holding means for holding translucent indicia at a predetermined disposition, a light source disposed behind the indicia with respect to a viewer, means facilitating interchangeability nd replacement of said indicia with other indicia, and support means facilitating supporting said assembly at one or more of a number of locations with respect to supporting surfaces, said holding means and said interchangeability facilitating means comprising at least one first set of upstanding columns each of which being formed with recesses in face portions thereof, frame means interconnecting and structurally aligning said columns with respect to one another and with respect to said support means, said support means comprising a second set of upstanding columns extending when assembled with said holding means in substantial alignment with said first set of columns, pairs of opposing recesses formed within pairs of said first set of columns accommodating said indicia.

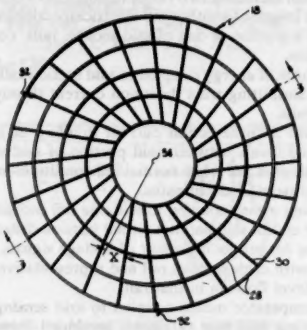
4,117,534
LUMINAIRE ARRANGEMENT

Herbert Arnold Odle, Newark, Ohio, assignor to Johns-Manville Corporation, Denver, Colo.

Filed Jan. 17, 1977, Ser. No. 759,923
Int. Cl.[2] F21V *15/00, 21/00*
U.S. Cl. 362—378 8 Claims

4. A guard for a luminaire arrangement comprising a plurality of wire-like elements at least one of which is a circumferential element having an imaginary axis and a plurality of ribs which are circumferentially spaced about and extend outwardly from said circumferential element, said ribs being positioned such that none of said ribs intersects said axis.

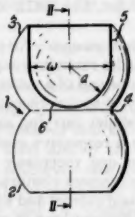




4,117,535
LIGHT FITTINGS

John Ruy Holt, 189 St. Pancras Way, College Green, London, England

Filed Jun. 18, 1976, Ser. No. 697,363
Claims priority, application United Kingdom, Jun. 21, 1975, 26456/75
Int. Cl.[2] F21V *19/00;* F21S *3/12, 13/02*
U.S. Cl. 362—382 6 Claims



1. In or for use in a flexible support for a light fitting, a link which comprises:

(a) a first section which has a part spherical outer surface; and p1 (b) a second section which is connected to said first section and has a part spherical internal surface, and an elongated slot which opens into said second section communicating with said part spherical internal surface and

extends from that portion of said second section remote from said first section to a point on said second section close to said first section;

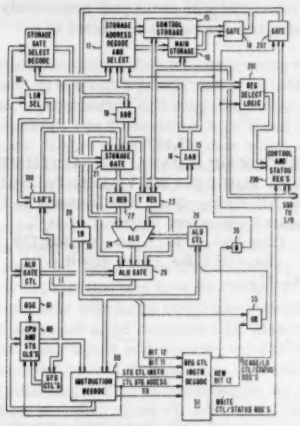
said link being such that the first section of a similar link can be introduced into the second section of said link so that the part spherical outer surface of the secton of said similar link is commensurate with and frictionally engages the part spherical internal surface of said second section of said link and said links can be moved relative to one another within the confines of said elongated slot.

4,117,536

INSTRUCTION PROCESSING CONTROL APPARATUS

Ronald Eugene Bodner, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,373
Int. Cl.[2] G11C *8/00*
U.S. Cl. 364—200 **9 Claims**



1. In a stored program computer an addressable storage containing data and instructions, said instructions including storage access instructions and register access instructions,

instruction decode means connected to receive from said storage storage access and register access instructions and responsive to said storage access instructions for generating storage control signals and responsive to said register access instructions for generating register control signals,

a plurality of addressable registers for storing data,

a source of addresses,

addressing means connected to receive addresses from said source of addresses and selectively operable under control of storage control signals to address said storage and under control of register control signals to address said registers,

and means for applying said storage control signals and said register control signals to said addressing means whereby said storage is addressed upon said instruction decode means decoding a storage access instruction and said registers are addressed upon said instruction decode means decoding a register access instruction.

4,117,537

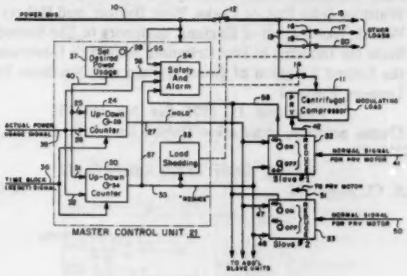
SYSTEM AND METHOD FOR LIMITING ENERGY CONSUMPTION

Paul William Muench, Medford Lakes, N.J., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Feb. 9, 1977, Ser. No. 767,238
Int. Cl.[2] H02J *1/10*; G05B *11/06*
U.S. Cl. 364—492 **31 Claims**

2. A demand regulating system for controlling the amount of power transferred over a power bus to an installation including at least one modulating electrical load which receives a load-regulating signal, comprising:

means for continually comparing the rate of actual power use against a desired rate of power use and for providing a hold signal when the actual rate exceeds the desired rate by a first amount, means for utilizing the hold signal to prevent additional loading of the modulating load, means



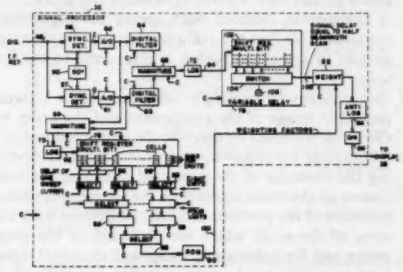
for providing a reduce signal when the actual rate exceeds the desired rate by a second amount which is greater than the first amount, and means for utilizing and reduce signal to reduce the load on the modulating load, in which said means for utilizing the reduce signal is operative in a given time period of reduce the load on the modulating load for only a fraction of that time period, allowing the system to stabilize during the remainder of that given time period.

4,117,538

RADAR SYSTEM WITH SPECIALIZED WEIGHTING

William W. Shrader, Stow, and Ronald B. Campbell, Jr., Sudbury, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed May 4, 1977, Ser. No. 793,578
Int. Cl.[2] G01S *9/42*; G06F *15/20*
U.S. Cl. 364—517 **12 Claims**



9. In a radar system providing a succession of range sweeps wherein a sequence of echo signals is produced during each of said range sweeps, a system for processing said echo signals comprising:

means for sampling signals at predetermined intervals of each of said sequences of echo signals to provide a plurality of series of samples with individual ones of said series corresponding to individual ones of said echo signal sequences;

selecting means responsive to sets of said samples wherein the first set of said sets consists of the first sample in each of said series, the second set of said sets consists of the second sample in each of said series, and subsequent sets consist respectively of subsequent samples in each of said series, said selecting means selecting a magnitude of sample in each of said sets; and

means coupled to said selecting means and responsive to selections of said selecting means for weighting successive

samples in one of said series of samples of said sampling means by weighting factors corresponding to respective ones of said selections.

4,117,539

AUTOMATIC INSPECTION OF MACHINED PARTS

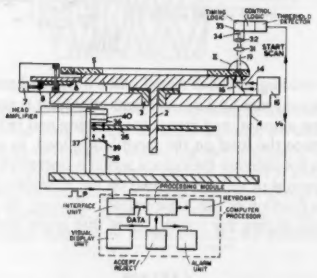
Donald Atkinson Bell, Teddington; Bernard John Chorley, Whitton; John Ronald Parks, West Byfleet, and Robert Lewis Wanek, London, all of England, assignors to The Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Jun. 11, 1976, Ser. No. 695,151

Claims priority, application United Kingdom, Jun. 12, 1975, 25273/75

Int. Cl.[2] G06F *15/00;* G01N *21/32*

U.S. Cl. 364—551 **10 Claims**



1. Apparatus for the automatic inspection of an axially symmetric profile of a component comprising:

a. a scanning system, including an image detecting array for scanning in a plurality of lines of scan a projected image of the profile of the component;

b. a projection system for projecting an image of the component's profile onto a plane containing the array;

c. a transparent member with means for supporting the component so that the component's projected image has an axis of symmetry which is transverse to the lines of scan;

d. motor means for causing relative movement between the projected image of the component and the array so that the array is caused to traverse the projected image; and

e. a computer for receiving at predetermined intervals during the scanning of the projected image by the scanning system an electrical signal from the scanning system representative of the portions of a line, coincident with a line of scan, of the array which are occluded by the projected image and for calculating, using said electrical signals, at least one of the parameters of length, breadth and curvature of the axis of symmetry and for comparing the calculated value of the parameter with a predetermined value to determine whether the value is within a predetermined range.

4,117,540

COMPUTING MODULE

Alain Bonnemay, Saclay, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Jan. 13, 1977, Ser. No. 759,199

Claims priority, application France, Jan. 14, 1976, 76 00878

Int. Cl.[2] G06J *1/00;* G06G *7/12*

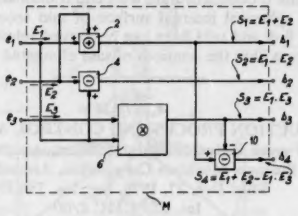
U.S. Cl. 364—602 **10 Claims**

1. A computing module having three inputs respectively e_1, e_2 and e_3, and four outputs, respectively s_1, s_2, s_3 and s_4, wherein said module comprises:

a summing circuit with two inputs respectively connected to e_1 and e_2 and one output connected to s_1,

a first subtracter with two inputs respectively connected to e_1 and e_2 and one output connected to s_2,

a multiplier with two inputs respectively connected to e_1 and e_3 and one output connected to s_3,



a second subtracter with two inputs respectively connected to s_1 and s_3 and one output connected to s_4.

4,117,541

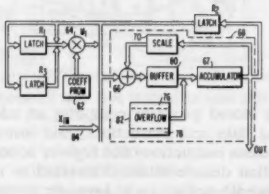
CONFIGURABLE PARALLEL ARITHMETIC STRUCTURE FOR RECURSIVE DIGITAL FILTERING

Mian Zaheer Ali, Gaithersburg, Md., assignor to Communications Satellite Corporation, Washington, D.C.

Filed Nov. 7, 1977, Ser. No. 849,279

Int. Cl.[2] G06F *15/34;* H04B *3/04*

U.S. Cl. 364—724 **7 Claims**



1. A high-speed digital arithmetic structure for implementing a recursive digital filter having a filter response defined by a plurality of filter coefficients, comprising:

a parallel bus;

means for providing filter input data samples to said parallel bus;

multiplication means having a tri-state output terminal coupled to said parallel bus, a first input terminal coupled to said parallel bus, and a second input terminal;

accumulating means having input and output terminals coupled to said parallel bus, said accumulating means providing at its output terminal a filter section output value comprising the accumulated value of said input data samples and the outputs from said multiplication means;

first storage means for storing said coefficients and for supplying said coefficients to the second input terminal of said multiplication means;

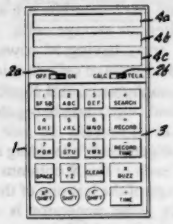
second storage means having a tri-state output terminal and an input terminal, both coupled to said parallel bus, said second storage means receiving and storing previous filter section output values and providing said previous values to the first terminal of said multiplication means; and

programmable control means for controlling both the coefficient values and the operating sequence of said multiplication means, accumulating means and first and second storage means in order to provide a desired filter response.

4,117,542
ELECTRONIC POCKET DIRECTORY

Judah Klausner, 18 E. 64th St., New York, N.Y. 10021, and Robert Hotto, 41 E. 19th St., New York, N.Y. 10003

Filed Jul. 7, 1977, Ser. No. 813,743
Int. Cl.[2] G06F *3/02, 3/14*
U.S. Cl. 364—900 17 Claims



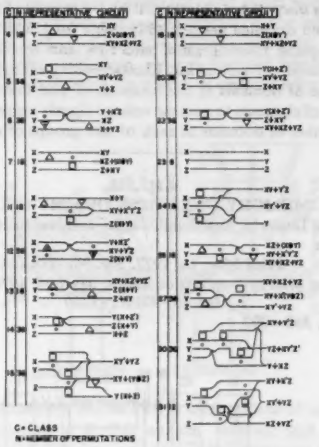
1. An electronic pocket directory comprising a case of a size and shape to fit in a user's pocket and to be held by one hand during use, a keyboard on said case comprising alphanumeric keys for numerals 1 to 0 and letters A to Z and function keys, alphanumeric display means in said case with a capacity of at least 10 letters or numbers, read-write memory circuit means in said case for storing and retrieving data items comprising persons' telephone numbers and street addresses, said memory circuit means having a capacity for storing a plurality of such data items under each of a multiplicity of persons' names as memory addresses, storing means controlled by said alphanumeric keys and said function keys for feeding to said memory circuit means said data items comprising telephone numbers and street addresses to be stored and for identifying the persons' names under which said items are to be stored, retrieving means controlled by said alphanumeric keys and said function keys for retrieving said data items stored by said memory circuit means including means for designating the name of the person under which the desired data items are stored and for displaying by display means said name and said data items stored under the designated name.

4,117,543
MAGNETIC BUBBLE LOGIC FAMILY

Robert C. Minnick, Houston, Tex.; Paul T. Bailey, Creve Coeur; Robert M. Sandfort, St. Charles, both of Mo., and Warren L. Semon, Dewitt, N.Y., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 24, 1972, Ser. No. 283,267
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—5 70 Claims

1. A conservative field accessed magnetic bubble logic circuit comprising means defining at least three input channels for transmitting magnetic bubbles, means defining at least three output channels for receiving and transmitting magnetic bubbles, and control means responsive to the combination of the presences and absences of bubbles received simultaneously on said three input channels to produce a presence or absence of a bubble on each of said output channels in accordance with a 'differentl logic function of X, Y and Z wherin X, Y and Z are binary variables represented by the presences or absences of bubbles received on said three input channels, respectively, the logic function for each output channel being different than the logic function for each one of the remaining output channels, each of said logic functions containing at least two of said variables, means to apply a cyclical propagating magnetic field to said means defining said input channels, said output channels and said control means to cause bubbles applied to said input channels to be transmitted through said control means to said output channels, said control means conserving bubbles and producing the same number of bubbles simultaneously on said output channels that appear simultaneously on said input channels, the bubbles being produced on said output channels a

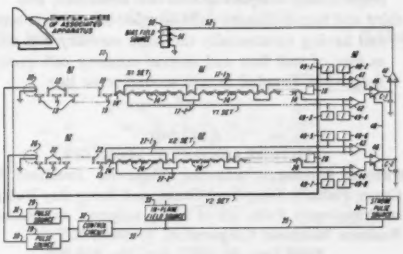


fixed number of cycles of said propagating magnetic field after the bubbles appear in said input channels.

4,117,544
MAGNETIC SINGLE-WALL DOMAIN BIAS FIELD CONTROL ARRANGEMENT

Cyrus Frank Ault, Wheaton, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 25, 1977, Ser. No. 800,447
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—28 21 Claims



1. A control arrangement for use in association with single-wall magnetic domain apparatus having thin-film layer means in which single-wall domains are maintained by a bias field and propagated by an in-plane rotating field, said arrangement comprising a thin-film magnetic bias field control layer in which single-wall magnetic domains can be generated and propagated, said bias field control layer having substantially the same properties as said layer means of said apparatus, a first pattern of magnetic propagating elements coupled to said bias field control layer defining a first channel including a first detector section, a second pattern of magnetic propagating elements coupled to said bias field control layer defining a second channel including a second detector section, each of said elements of said first and second channel being dimensioned for optimum propagation of domains of a first and a second predetermined diameter, respectively, first electrical circuit means for each of said channels for connecting elements of said first and second detector section in first groups including every *n*th element, second electrical circuit means for each of said channels for connecting elements of said first and sec-

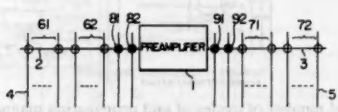
ond detector section in second groups including each of the elements between said elements of said first groups, and means energizable to generate magnetic domains in each of said channels of a diameter as determined by the magnitude of said bias field, said domains being propagatable long said channels by said in-plane rotating field, said first and second electrical circuit means of each of said channels being energizable by the presence of domains at the elements of said first and second groups of elements to present voltage signals corresponding to the number of domains at each of said groups of elements.

4,117,545

MEMORY INCLUDING DUMMY CELLS

Masaaki Inadachi, Kokubunji, Japan, assignor to Hitachi, Ltd., Japan

Filed Mar. 16, 1977, Ser. No. 778,108
Claims priority, application Japan, Mar. 26, 1976, 51-32574
Int. Cl.[2] G11C *13/00*
U.S. Cl. 365—207 **8 Claims**



4. A memory comprising:

at least a pair of first and second sense lines;

sense means for differentially sensing signals on said first and second sense lines;

first and second memory cell groups of different structure from each other coupled to each of said first and second sense lines;

first and second dummy cells coupled to said second sense line and having substantially the same memory cell structure as that of said first and second memory cell groups, respectively, coupled to said first sense line; and

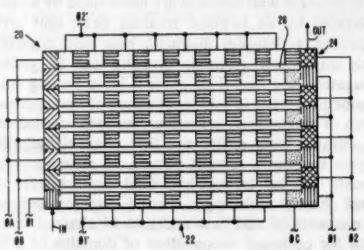
third and fourth dummy cells coupled to said first sense line and having substantially the same memory cell structure as that of said first and second memory cell groups, respectively, coupled to said second sense line.

4,117,546

INTERLACED CCD MEMORY

Narasipur Gundappa Anantha, Hopewell Junction; Moises Cases, Fishkill; Fung Yuel Chang, and Barry Jay Rubin, both of Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1977, Ser. No. 865,806
Int. Cl.[2] G11C *11/40*
U.S. Cl. 365—233 **12 Claims**



1. A two phase interlaced serial-parallel-serial memory comprising:

a serial input stage having M storage cells, including an input storage cell forming a first one of said M storage cells for receiving a serial bit stream;

a first clock pulse generator for providing a clock signal to said first storage cell permitting the transfer of data bits from said serial bit stream into and out of said first storage cell;

second and third clock pulse generators connected to alternate ones of the other of the M storage cells for serially transferring data bits to alternate ones of said other M storage cells until M/2 data bits are stored in said serial input stage at alternate storage cells;

a parallel storage array having M rows, corresponding to each one of said M storage cells in said serial input stage, and X columns, each one of said X columns having a first stage and a second stage, data being stored in only one of said two stages at all times;

a fourth clock pulse generator providing a clock signal to the second stage of each of the X columns with the exception of the second stage of the last one of the X columns where the fourth clock pulse generator is connected to only alternate storage cells at M/2 rows;

a fifth clock pulse generator for providing a clock signal to the first stage of each of the X columns, the first stage of the first column being directly coupled to said serial input stage;

a sixth clock pulse generator for providing a clock signal to those alternate storage cells in the second stage of the last one of the X columns corresponding to the M/2 rows not connected to the fourth clock pulse generator;

a serial output stage having M storage cells and directly coupled to the second stage of the last one of the X columns; and

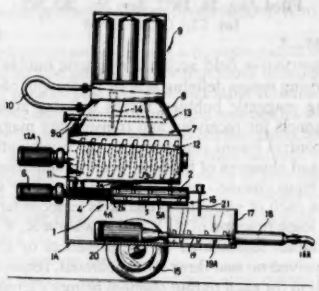
a seventh clock pulse generator for providing a clock signal to alternate ones of the M storage cells of the serial output stage, the other M/2 storage cells in the serial output stage being provided a clock signal by said first clock pulse generator.

4,117,547

APPARATUS FOR THE PREPARATION OF MORTAR OR THE LIKE

Paul Mathis, Freiburg-Lehen, and Max Zimmer, Istein, both of Fed. Rep. of Germany, assignors to Mathis Fertigputz GmbH, Fed. Rep. of Germany

Filed May 26, 1976, Ser. No. 690,276
Claims priority, application Fed. Rep. of Germany, May 27, 1975, 2523374; Sep. 29, 1975, 2543379
Int. Cl.[2] B28C *7/14*
U.S. Cl. 366—17 **36 Claims**



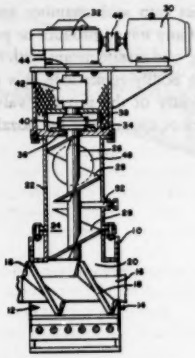
1. Apparatus for the preparation of plastic building material which includes solid and liquid constituents, particularly for continuous preparation of mortar, comprising a mixing vessel; first and second feeding means for respectively admitting into said vessel metered quantities of solid and liquid constituents whereby such constituents are converted into building material

in the interior of said vessel; means for evacuating building material from said vessel at such a rate that the quantity of material in the interior of said vessel is at least substantially constant and the vessel is filled to less than capacity; a container for the material which is evacuated from said vessel; and means for arresting at least one of said feeding means, including a level detector arranged to monitor the quantity of building material in said container and to effect stoppage of said one feeding means when the quantity of building material in said container exceeds a predetermined quantity.

4,117,548
SCREW VENT

Gregory C. Craig, Piqua, Ohio, assignor to The French Oil Mill Machinery Company, Piqua, Ohio

Filed Nov. 30, 1977, Ser. No. 856,103
Int. Cl.[2] B29B *1/10*
U.S. Cl. 366—83 **6 Claims**



1. A vent for a devolatilizer which includes a cylindrical cage having an inlet and outlet for a material to be devolatilized, a rotatable shaft carrying a plurality of screw members in said cage arranged to convey the material through said cage, and means for rotating said shaft, comprising:

means defining a vent opening in said cage,

vent duct means, communicating with said vent opening, for defining a cylindrical vent chamber into which vapor may escape,

vent screw means in said vent chamber, including a screw body and helical screw flight portion extending around said screw body, said screw body being of minimal diameter and the pitch of said screw flight portion being sufficiently large such that the velocity of vapor leaving said gate through said vent opening is maintained below a predetermined maximum vapor velocity,

motor means connected to said screw body, for rotating said vent screw means in said vent chamber, and

vapor return means, communicating with said vent chamber, for extracting vapor from said chamber.

4,117,549
EXTRUDER SEAL

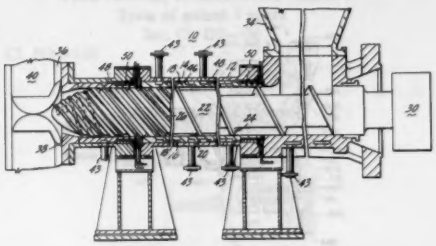
Richard Douglas Antrim, Newtown, Conn., assignor to USM Corporation, Farmington, Conn.

Filed Jul. 13, 1977, Ser. No. 815,367
Int. Cl.[2] B29B *1/06*
U.S. Cl. 366—99 **6 Claims**

1. A mixing extruder for the processing of rubber, plastics and the like materials, said extruder including a housing with a generally cylindrical bore therein and a rotor rotatably mounted in the bore, the housing having a feed opening and a discharge opening at respective ends thereof, said housing also comprising:

at least one cylinder in a contiguous relationship with another portion of said extruder; wherein said cylinder has two ends, the cylinder comprising an outer jacket having an annular end plate fixed thereto, and an inner liner having a flange therearound, the outer jacket being coaxially disposed about and spaced apart from the inner liner, the inner surface of said liner defining said bore;

a heat transfer fluid flow channel disposed between said outer jacket and said inner liner of said cylinder; and

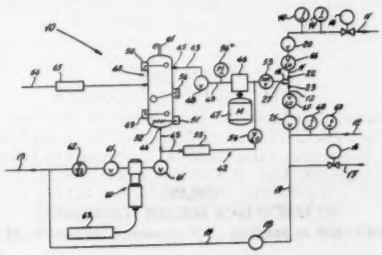


a seal arrangement disposed on at least one end of said cylinder including a flexible annular bellows, said bellows having two ends, one end of said bellows being attached to said flange on said liner, the other end of said bellows being attached to the annular end plate fixed to said outer jacket.

4,117,550
EMULSIFYING SYSTEM

Roy E. Folland, Clarenceville, and Richard C. Millar, Otterburn Park, both of Canada, assignors to Folland Enertec Ltd., Quebec, Canada

Filed Feb. 14, 1977, Ser. No. 768,171
Int. Cl.[2] B01F *5/10, 15/02*
U.S. Cl. 366—136 **7 Claims**



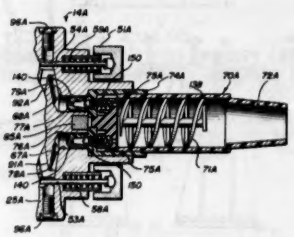
1. An emulsifying system for mixing accurate ratios of two or more liquids to form an emulsion, said system comprising means for supplying an accurate mixture of said two or more liquids, an emulsifying device to emulsify said mixture into an emulsion, emulsion storage means for storing a quantity of said emulsion that may vary between predetermined limits, an output circuit to draw said emulsion from said emulsion storage means, a recirculating circuit connected at said output circuit and having a recirculating pump to recirculate said emulsion to said emulsifying device where said emulsion is regenerated and returned to said storage means whereby said emulsion in said storage means is maintained in a usable state, said emulsion storage means permitting the supply of said mixture to it at a rate independent of the rate at which said emulsion is drawn from said output.

4,117,551

PURGEABLE DISPENSING GUN FOR POLYURETHANE FOAM AND THE LIKE

William R. Brooks, 1 S. 549 Forest Trail, Oak Brook, Ill. 60521, and Irving C. Heinzel, Des Plaines, Ill., assignors to William R. Brooks, Oak Brook, Ill.

Continuation-in-part of Ser. No. 474,381, May 30, 1974, abandoned. This application Jun. 27, 1975, Ser. No. 591,174
Int. Cl.[2] B05B 7/12
U.S. Cl. 366—162 7 Claims



1. A system for mixing and dispensing a product fluid comprising: containers for separately stored constituents; a gun housing with conduit means connected to said containers; product constituent passages and primary valves in said gun housing, said primary valves being operable to control constituent flow though said passages; actuator means in the gun housing for selectively operating said primary valves to control the flow of corresponding fluid product constituents into the gun housing; replaceable nozzle means mounted in said gun housing for receiving and mixing the product constituents and for dispensing the resultant mixed product, including a mixing chamber having a dispensing orifice, a pair of product constituent tabulations opening individually into said chamber away from said orifice and having coupling means connected to a corresponding product constituent passage in said gun housing, and check valve means mounted in said nozzle means flowpathwise between each of said tabulations and said mixing chamber for selectively admitting the corresponding fluid product constituent into said chamber and for obstructing retrograde flow of any mixed product or product constituent to the gun housing; said nozzle means with the included check valve means being bodily removable as a unit from the gun housing independently of the primary valves for permitting repair, replacement or cleaning of the nozzle means.

DESIGNS

SEPTEMBER 26, 1978

249,596

LACROSSE ELBOW GUARD

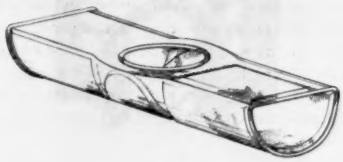
Robert J. Rule, Manhasset, N.Y., assignor to W. H. Brine Co., Needham, Mass.

Filed Dec. 6, 1976, Ser. No. 747,981

Term of patent 14 years

Int. Cl. D2—*02*

U.S. Cl. D2—27



249,597

WELDING SHIELD

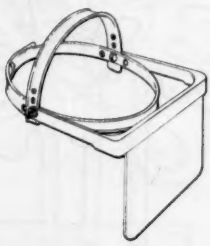
Nicholas Thomas Edward Dillon, 10 East St., Magill, South Australia, Australia

Filed Sep. 9, 1976, Ser. No. 721,696

Term of patent 14 years

Int. Cl. D2—*03*

U.S. Cl. D2—234



249,598

SPORT SOCK

Elizabeth A. Magnuson, 4148 Yates Ave. N., Robbinsdale, Minn. 55422

Filed Nov. 12, 1976, Ser. No. 741,345

Term of patent 7 years

Int. Cl. D2—*04*

U.S. Cl. D2—330

249,599

COMBINED BRUSH AND SCRAPER

Wiley M. Whitaker, Ramseur, N.C., assignor to Whit Corporation

Filed Jun. 20, 1977, Ser. No. 807,824

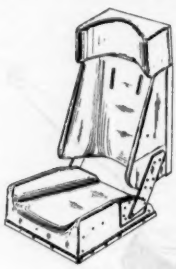
Term of patent 14 years

Int. Cl. D4—*01;* D7—*05*

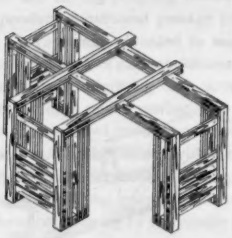
U.S. Cl. D4—06

249,600
MAKE-UP BRUSH
Arleen Bowman, New York, N.Y., assignor to Bowman Trading Co., Inc., New York, N.Y.
Filed Sep. 20, 1976, Ser. No. 724,904
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—25

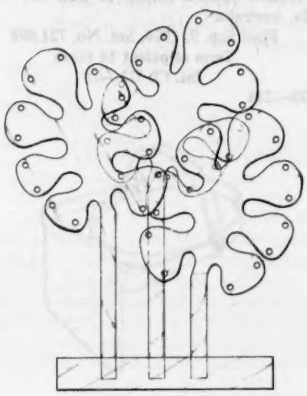
249,601
SEAT
Robert E. Burridge, Mt. Lebanon, Pa., assignor to Contourpedic Corporation, Saddle Brook, N.J.
Filed Jan. 9, 1976, Ser. No. 647,707
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—5



249,602
SUPPORT FOR USE WITH ELECTRONIC COMPUTER UNITS
David A. O'Connor, Virginia Beach, Va., assignor to Virginia National Bankshares, Inc., Norfolk, Va.
Filed Mar. 23, 1976, Ser. No. 669,604
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—85



249,603
DISPLAY STAND FOR PIERCED EARRINGS
Vincent DiBartolo, Cresskill, N.J., assignor to Mele Manufacturing Co.
Filed Feb. 24, 1977, Ser. No. 771,531
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—85



249,604

PROTECTIVE COVER FOR ROLLS OF TOILET PAPER

Wai-Hung Woo, c/o Woody Trading Co. H.K., 38 Kam Lam St., 5th floor, Block "S", Mongkok, Kowloon, Hong Kong

Filed Aug. 22, 1977, Ser. No. 826,430

Claims priority, application United Kingdom, Feb. 23, 1977, 978994/77

Term of patent 14 years

Int. Cl. D23—*02*

U.S. Cl. D6—86

249,605

SOAP BAR HOLDER

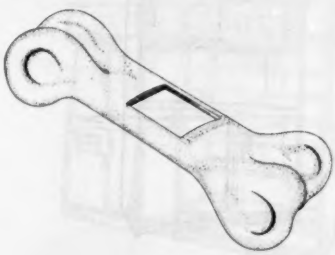
Geraldine J. Skermetta, 7914 Village Oak, San Antonio, Tex. 78233

Filed Sep. 27, 1976, Ser. No. 726,584

Term of patent 14 years

Int. Cl. D23—*02;* D30—*99*

U.S. Cl. D6—89



249,606

CONTAINER DISPLAY RACK

John W. Terdina, West Chicago, and Clarence A. Kec, St. Charles, both of Ill., assignors to J.W.T. Industries, West Chicago, Ill.

Filed Aug. 16, 1976, Ser. No. 714,379

Term of patent 14 years

Int. Cl. D20—*02;* D6—*08*

U.S. Cl. D6—125

249,607

JEWELRY ORGANIZER OR SIMILAR ARTICLE

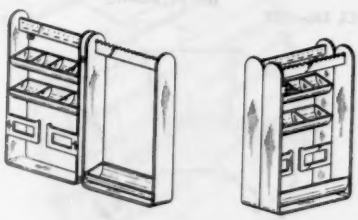
Jerrold J. Goldman, 6 Ridgeway Terr., Spring Valley, N.Y. 10977, and Robert Petre, 25 Longspur Rd., Yonkers, N.Y. 10703

Filed Oct. 8, 1976, Ser. No. 730,812

Term of patent 14 years

Int. Cl. D6—*04*

U.S. Cl. D6—130

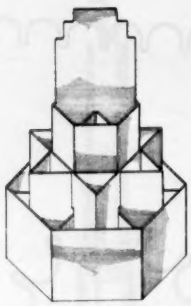


249,608

DISPLAY UNIT OR THE LIKE

Benjamin V. Wright, El Cerrito, Calif., assignor to Primo Incense Corporation, Los Angeles, Calif.

Filed Jun. 14, 1976, Ser. No. 695,511
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—146

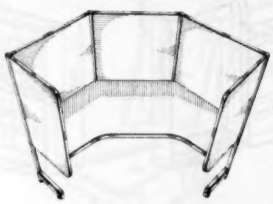


249,609

EDUCATIONAL MODULE WITH SWINGABLE END PANELS

Edward J. Kramer, 19320 Sound View Dr., Stanwood, Wash. 98292

Continuation-in-part of Ser. No. 567,613, Apr. 14, 1975, and Ser. No. 567,614, Apr. 14, 1975, and Ser. No. 567 ,706, Apr. 14, 1975.
This application Dec. 29, 1976, Ser. No. 755,491
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—157

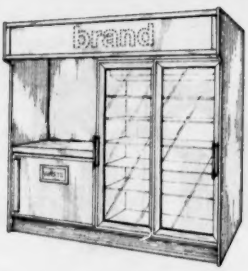


249,610

CONVENIENCE FOOD SERVICE CENTER

Theodore R. Burton, 305 Miltwood Rd., Greensboro, N.C. 27408

Filed Oct. 18, 1976, Ser. No. 721,168
Term of patent 14 years
Int. Cl. D6—*04;* D20—*02;* D15—*07*
U.S. Cl. D6—169



249,611

CONVENIENCE FOOD SERVICE CENTER

Theodore R. Burton, 305 Miltwood Rd., Greensboro, N.C. 27408

Filed Oct. 18, 1976, Ser. No. 721,167
Term of patent 14 years
Int. Cl. D6—*04;* D20—*02*
U.S. Cl. D6—169

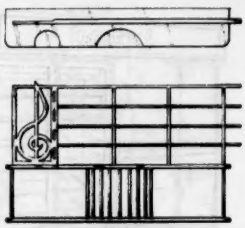
249,612
CONVENIENCE FOOD SERVICE CENTER
Theodore R. Burton, 305 Miltwood Rd., Greensboro, N.C. 27408
Filed Oct. 18, 1976, Ser. No. 721,169
Term of patent 14 years
Int. Cl. D6—*04;* D20—*02;* D15—*07*
U.S. Cl. D6—169

249,613
CONVENIENCE FOOD SERVICE CENTER
Theodore R. Burton, 305 Miltwood Rd., Greensboro, N.C. 27408
Filed Oct. 18, 1976, Ser. No. 721,170
Term of patent 14 years
Int. Cl. D6—*04;* D20—*02*
U.S. Cl. D6—169

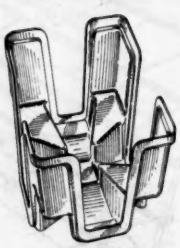
249,614
CONVENIENCE FOOD SERVICE CENTER
Theodore R. Burton, 305 Miltwood Rd., Greensboro, N.C. 27408
Continuation-in-part of Ser. No. 721,168, Sep. 7, 1976. This application Oct. 18, 1976, Ser. No. 733,458
Term of patent 14 years
Int. Cl. D6—*04;* D15—*07*
U.S. Cl. D6—169

249,615
KNOCK DOWN DISPLAY STAND
De Vern C. Frisbey, 8430 SW. Canyon Dr., Portland, Oreg. 97225
Filed Sep. 7, 1976, Ser. No. 720,792
Term of patent 14 years
Int. Cl. D6—*04;* D20—*02*
U.S. Cl. D6—180

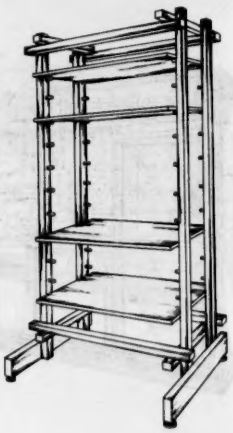
249,616
STAND FOR POTTED PLANTS
Joseph B. Connolly, 9 Pleasant St., Waverly, N.Y. 14892
Filed Jun. 30, 1977, Ser. No. 811,994
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—182



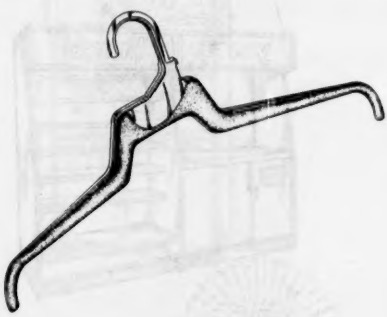
249,617
COMBINED STORAGE AND TYING CONTAINER FOR NEWSPAPERS
Ronald Bozicnik, 4017 Grant St., Westmont, Ill. 60559
Filed Mar. 10, 1977, Ser. No. 776,133
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—184



249,618
SHELF UNIT
Allan Oxenhandler, 444 Crest Ave., Kirkwood, Mo. 63122
Filed Dec. 20, 1976, Ser. No. 752,262
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—186



249,619
SHIRT HANGER
Douglas F. Wolff, Marshall, Mich., assignor to John Thomas Batts, Inc., Zeeland, Mich.
Filed Jun. 20, 1977, Ser. No. 807,986
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—247

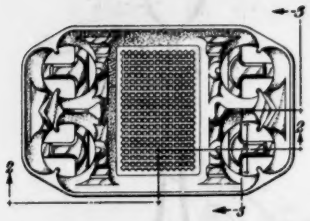


249,620

COMBINED FOOD AND BEVERAGE TRAY

Henry R. Vigue, Waterville, Me., assignor to Keyes Fibre Company

Filed Dec. 27, 1976, Ser. No. 754,257
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—38

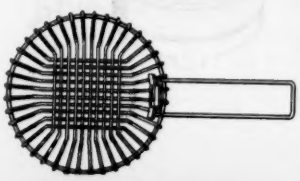


249,621

DEEP FAT FRYER BASKET

Vladimir J. Ondrasik, II, 17044 Westbury Dr., Granada Hills, Calif. 91344

Filed Aug. 12, 1977, Ser. No. 823,982
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—47



249,622

BEVERAGE TRAY

Henry R. Vigue, Waterville, Me., assignor to Keyes Fibre Company

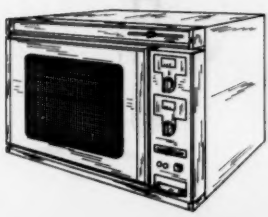
Filed Dec. 27, 1976, Ser. No. 754,259
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—71

249,623

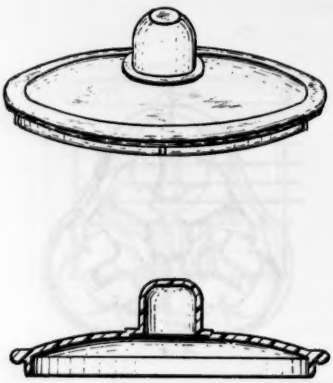
ELECTRONIC COOKING RANGE

Mikio Kosako, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 11, 1976, Ser. No. 665,957
Claims priority, application Japan, Oct. 24, 1975, 50/42776
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—128



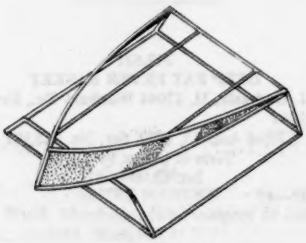
249,624
COVER FOR A CANISTER
Jack Solomon, Harbor Isle, Island Park, N.Y., assignor to Pearl-Wick Corporation, Long Island City, N.Y.
Filed Feb. 10, 1977, Ser. No. 767,519
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—131



249,625
SPOON OR SIMILAR ARTICLE OF FLATWARE
Ben Seibel, New York, N.Y., assignor to Oxford Hall Silversmiths, Ltd., New York, N.Y.
Filed Aug. 18, 1976, Ser. No. 715,481
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

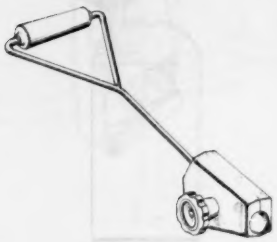
249,626
SPOON OR SIMILAR ARTICLE OF FLATWARE
Ben Seibel, New York, N.Y., assignor to Oxford Hall Silversmiths, Ltd., New York, N.Y.
Filed Aug. 18, 1976, Ser. No. 715,596
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

249,627
ELECTRIC IRON STAND OR THE LIKE
Tadao Otsuji, 1856 Ninth Ave., Honolulu, Hi. 96816
Filed Sep. 20, 1977, Ser. No. 835,248
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—205



249,628
HOUSING FOR PLANT TURNTABLE
Robert F. Levine, 13107 Mindino Way, Marina Del Rey, Calif. 90291
Filed Oct. 26, 1976, Ser. No. 735,674
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D8—1

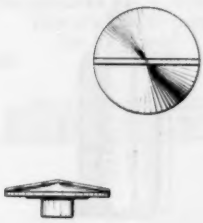
249,629
FOLDING CONTROL HANDLE FOR LAWN AND GARDEN IMPLEMENT
Walter H. Droegemuller, Arlington Heights, Ill., assignor to The Toro Company, Minneapolis, Minn.
Filed Feb. 16, 1977, Ser. No. 769,019
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—1



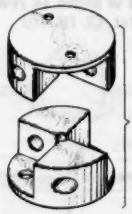
249,630
ROTARY LAWN EDGER, TRIMMER OR SIMILAR ARTICLE
George C. Ballas, Houston, Tex., assignor to Weed Eater, Inc.
Filed Aug. 24, 1976, Ser. No. 717,504
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—8

249,631
SCISSORS
Reiner Hellmann, Solingen, Fed. Rep. of Germany, assignor to Wilhelm Boos, Jr. (GmbH & Co.), Solingen, Fed. Rep. of Germany
Filed Nov. 11, 1976, Ser. No. 741,283
Claims priority, application Fed. Rep. of Germany, Jun. 12, 1976, 5 MR 8681
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—57

249,632
SHEET METAL WORKING TOOL
William J. Meis, 6 Valley Dr., Crescent, Iowa 51526
Filed Nov. 12, 1976, Ser. No. 741,330
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—70

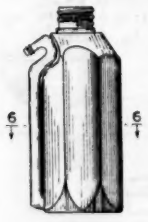


249,633
SKI LOCK DEVICE
George N. Sasaki, P.O. Box 61121, Sunnyvale, Calif. 94088
Filed Mar. 17, 1977, Ser. No. 778,491
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—331



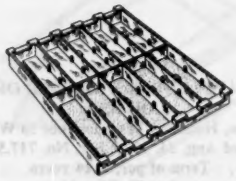
249,634
BEARING COVER PLATE FOR A VERTICAL BAR CAM LOCK
John V. Pastva, Jr., Parma Heights, Ohio, assignor to The Eastern Company, Naugatuck, Conn.
Filed Jun. 10, 1976, Ser. No. 694,659
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—346

249,635
BOTTLE
Barry Jack Elliott, Shirley, England, assignor to Azlon Products Ltd., London, England
Filed Jun. 7, 1976, Ser. No. 693,569
Claims priority, application United Kingdom, Feb. 24, 1976, 974610/76
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—71

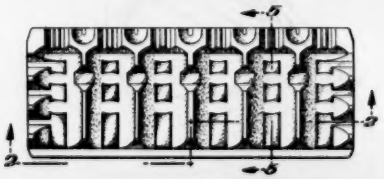


249,636
BOTTLE
Donald Arthur Wolstenholme, Harrogate, England, assignor to Saml. Smith Old Brewery (Tadcaster) Limited, Tadcaster, England
Filed Dec. 6, 1976, Ser. No. 748,152
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—159

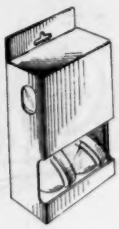
249,637
DISPENSER FOR RAZOR BLADE CARTRIDGES
Clemens A. Iten, Staunton, Va., assignor to American Safety Razor Company, Verona, Va.
Filed Nov. 11, 1976, Ser. No. 740,775
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—187



249,638
PACKING TRAY FOR FLUORESCENT TUBES
Gilbert R. Chadbourne, Oakland, Me., assignor to Keyes Fibre Company, Me.
Filed Dec. 27, 1976, Ser. No. 754,256
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—189



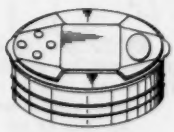
249,639
DISPLAY PACKAGE
John W. L. Hogg, Benton Harbor, Mich., and G. Norman Heaton, Elkhart, Ind., assignors to Shepherd Products U.S. Inc., St. Joseph, Mich.
Filed Oct. 15, 1976, Ser. No. 732,670
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—193



249,640
COMBINED PACKAGING CONTAINER AND LID THEREFOR
Frederick Harold Edwards, Mentone, Australia, assignor to Vinyl Clad Proprietary Limited
Filed Sep. 11, 1975, Ser. No. 612,474
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—220

249,641
DISPENSING CONTAINER OR THE LIKE
Carmelo P. Dali, Cheshire, Conn., assignor to American Home Products Corp., New York, N.Y.
Filed Oct. 27, 1976, Ser. No. 735,933
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—224

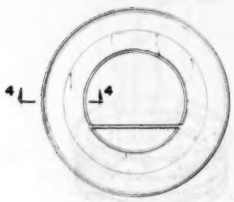
249,642
DISPENSING TOP FOR GRANULATED MATERIAL
John B. Ames, 100 Valley Rd., Marion, Ala. 36756
Filed Jul. 29, 1976, Ser. No. 709,597
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—257



249,643
CLOSURE OR SIMILAR ARTICLE
Ernest L. Smith, Kansas City, Mo., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Continuation-in-part of Ser. No. 533,122, Jun. 18, 1975, abandoned. This application Apr. 9, 1976, Ser. No. 675,404
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—267

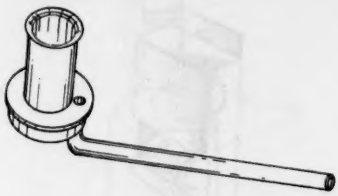
249,644
DISPENSING CLOSURE FOR CONDIMENT BOTTLES
Rudolf L. Oeckl, c/o Englebert Knipfler, 262-15 Hillside Ave., Floral Park, N.Y. 11004
Filed Aug. 12, 1976, Ser. No. 713,812
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—275

249,645
PAINT CAN ATTACHMENT
Edward Tedesco, Fort Lauderdale, Fla., assignor to Tedco Products, Fort Lauderdale, Fla.
Filed Aug. 6, 1976, Ser. No. 712,304
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—289



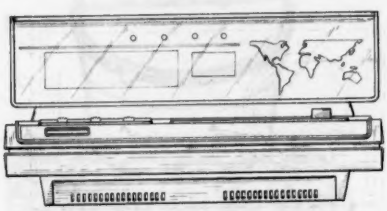
249,646
POURING SPOUT
John C. Ritter, 12645 Duchess, Detroit, Mich. 48224
Filed Mar. 4, 1976, Ser. No. 663,731
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—290

249,647
POURING SPOUT FOR A CONTAINER
Donald Terry Goodall, 30 Beach St., Blakehurst, Sydney, New South Wales, Australia
Filed Apr. 30, 1976, Ser. No. 681,809
Claims priority, application Australia, Nov. 4, 1975, 68068/75; Nov. 24, 1975, 68166/75
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—290

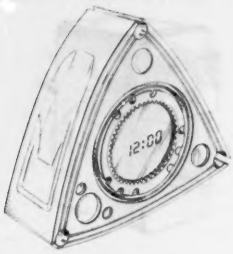


249,648
CLOCK BODY
Theodoor Willem Geitenbeek, 16 Dulcie Grove, Moorabbin, 3189 Victoria, Australia
Filed Oct. 23, 1975, Ser. No. 625,154
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—1

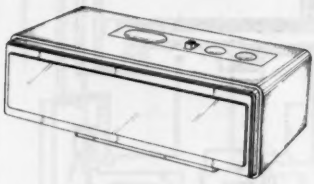
249,649
UNIVERSAL CALENDAR CLOCK
Takashi Ohtani, Chofu, Japan, assignor to Realtone Electronics, Inc., Tokyo, Japan
Filed Jan. 7, 1977, Ser. No. 757,728
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—3



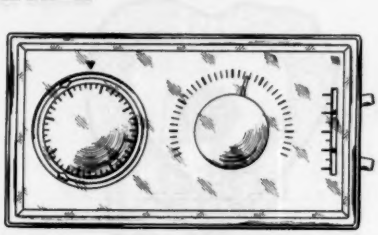
249,650
DIGITAL CLOCK
Mark J. Schoenfeld, 4037 W. Garden Dr., Phoenix, Ariz. 85029
Filed Dec. 17, 1976, Ser. No. 751,907
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—6



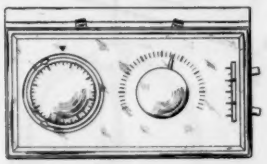
249,651
DIGITAL CLOCK
Nobuyoshi Hirosawa, Chofu, Japan, assignor to Kabushiki Kaisha Sankyo Seiki Seisakusho, Shimosuwa, Japan
Filed Dec. 8, 1976, Ser. No. 748,441
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15



249,652
CASING FOR A TIMER CONTROLLED THERMOSTAT OR THE LIKE
Jerry W. McElroy, St. Louis County, and Michael A. Kerper, Richmond Heights, both of Mo., assignors to Emerson Electric Co., St. St. Louis, Mo.
Filed Nov. 1, 1976, Ser. No. 737,559
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—51



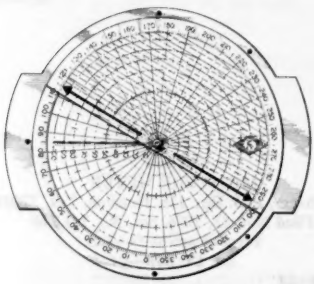
249,653
CASING FOR A TIMER CONTROLLED THERMOSTAT OR THE LIKE
Jerry W. McElroy, St. Louis County, and Michael A. Kerper, Richmond Heights, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.
Filed Nov. 1, 1976, Ser. No. 737,725
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—51



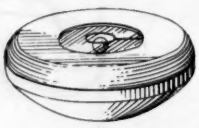
249,654
MOISTURE METER
Stephen J. Shaper, P.O. Box 125, Houston, Tex. 77001
Filed Nov. 15, 1976, Ser. No. 741,746
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—53

249,655
FAUCET CONNECTOR SIZE GUIDE
Gregory G. Gullaksen, Frankfort, and Var E. Lordahl, Chicago, both of Ill., assignors to Beatrice Foods Co., Chicago, Ill.
Filed Jun. 7, 1976, Ser. No. 693,376
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—64

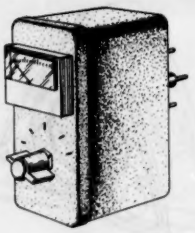
249,656
AIRCRAFT NAVIGATION PLOTTER
Marcus A. Mihail, 6832 Antigua Way, Sacramento, Calif. 95831
Filed Jan. 10, 1977, Ser. No. 758,052
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—65



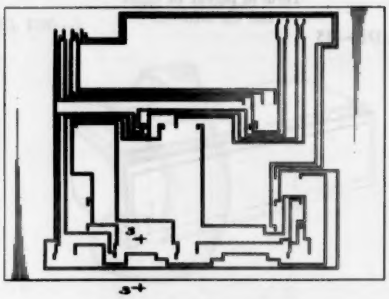
249,657
GOLF TEE LEVEL
Leighton E. Griffiths, 325 Pompton Ave., Pompton Lakes, N.J. 07442
Filed Jan. 11, 1977, Ser. No. 758,507
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—69



249,658
TELEPHONE CARRIER EQUIPMENT MULTITESTER
Gary Conway Fields, Oakland, Calif., assignor to Leemah Electronics, Inc.
Filed Jul. 30, 1976, Ser. No. 710,091
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—78



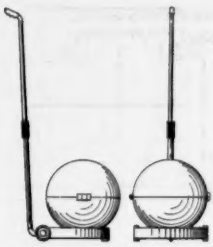
249,659
PLAQUE
Alfiero F. Balzano, 606 N. Acacia, Fullerton, Calif. 92631
Filed Jun. 14, 1976, Ser. No. 695,520
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—132



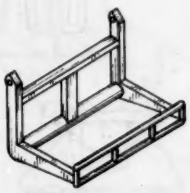
249,660
HOLDER FOR FLORAL ARRANGEMENT
Gene Meyer, 12 Quay Ct., Centerport, N.Y. 11721
Filed Nov. 1, 1977, Ser. No. 847,677
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—149

249,661
COMBINED COIN CHEST AND COIN
David C. Goodwin, 1258 Rosita Rd., Pacifica, Calif. 94044
Filed Jul. 12, 1976, Ser. No. 704,249
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—157

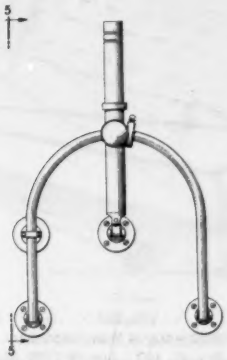
249,662
BOWLING BALL CADDY
Blanche A. Morley, 3401 N. Franklin, Stockton, Calif. 95204
Filed Mar. 2, 1977, Ser. No. 777,946
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—33



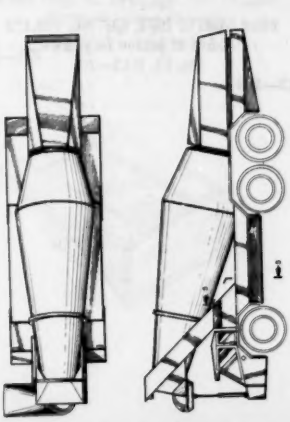
249,663
CONTAINER CRADLE FOR A HYDRAULIC CANE DUMPER
Harold A. Willett, P.O. Box 968, Thibodaux, La. 70301
Filed Nov. 3, 1975, Ser. No. 628,405
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—60



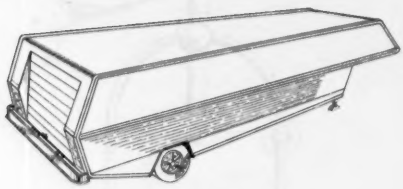
249,664
MOUNTING BRACKET FOR FISHING OUTRIGGER POLE
Lloyd Vernon Hall, 238 S. Florette, Anaheim, Calif. 92804
Filed Mar. 10, 1976, Ser. No. 665,605
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—70



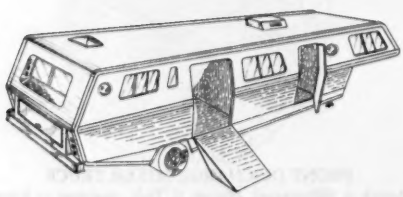
249,665
FRONT DISCHARGE MIXER TRUCK
Frederick J. Silbernagel, Huron, S. Dak., assignor to Forward, Inc., Huron, S. Dak.
Filed Jan. 21, 1977, Ser. No. 761,440
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D12—95



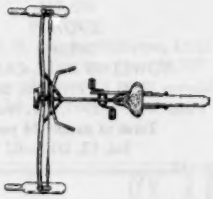
249,666
CARGO TRAILER
Noel Gene Thompson, 2517-3 Abbey Dr., Fort Wayne, Ind. 46815
Filed Mar. 7, 1977, Ser. No. 775,173
Term of patent 14 years
Int. Cl. D12—*10*
U.S. Cl. D12—97



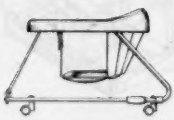
249,667
COMBINED TRAVEL AND HORSE TRAILER
Noel Gene Thompson, 2517-3 Abbey Dr., Fort Wayne, Ind. 46815
Filed Mar. 7, 1977, Ser. No. 775,172
Term of patent 14 years
Int. Cl. D12—*10*
U.S. Cl. D12—103



249,668
TRICYCLE
Herbert Penner, and Philip Penner, both of Box 97, Turpin, Okla. 73950
Filed Jan. 27, 1977, Ser. No. 762,869
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—112

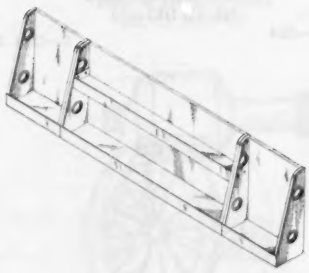


249,669
INFANT WALKING TRAINER
Kenzou Kassai, Higashishimizu, Japan, assignor to Kassai Kabushikikaisha, Higashishimizu, Japan
Filed Oct. 27, 1976, Ser. No. 736,193
Term of patent 14 years
Int. Cl. D12—*12*
U.S. Cl. D12—130

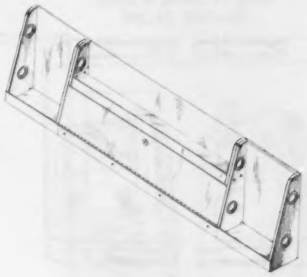


249,670
BEHIND SEAT STORAGE COMPARTMENT FOR TRUCKS OR THE LIKE
Jack C. VanderWaal, Sumner, Wash., assignor to Sea-Lect Products Inc., Kent, Wash.
Filed Apr. 11, 1977, Ser. No. 786,686
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155

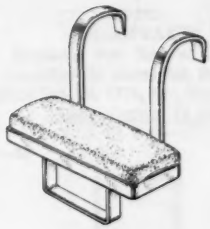
249,671
BEHIND SEAT STORAGE COMPARTMENT FOR TRUCKS OR THE LIKE
Jack C. VanderWaal, Sumner, Wash., assignor to Sea-Lect Products Inc., Kent, Wash.
Filed Apr. 11, 1977, Ser. No. 786,687
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155



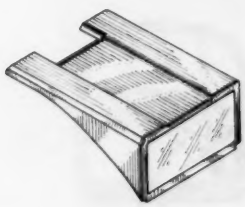
249,672
BEHIND SEAT STORAGE COMPARTMENT FOR TRUCKS OR THE LIKE
Jack C. VanderWaal, Sumner, Wash., assignor to Sea-Lect Products Inc., Kent, Wash.
Filed Apr. 11, 1977, Ser. No. 786,688
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155



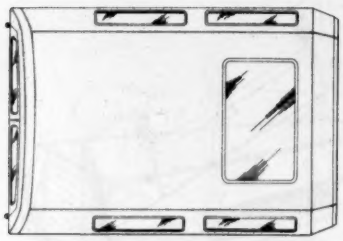
249,673
AUTOMOBILE ARMREST
Robert S. Cortez, 1617 Pomona Ave., San Jose, Calif. 95110
Filed Apr. 27, 1977, Ser. No. 791,585
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155

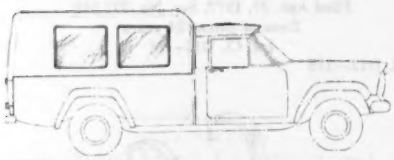


249,674
AUTOMOBILE TOP ATTACHMENT
Jeffrey K. Tamura, 14540 Delano St., and Scott I. Grundfor, 14163 Friar St., both of Van Nuys, Calif. 91401
Filed Aug. 12, 1976, Ser. No. 713,866
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—156



249,675
TRUCK BED CLOSURE
Charles Mashigan, Redford, Mich., assignor to American Motors Corporation, Southfield, Mich.
Filed May 4, 1977, Ser. No. 793,702
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—156

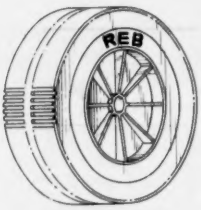




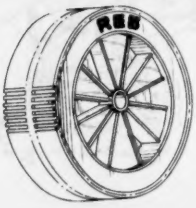
249,676
LUGGAGE CARRIER FOR BICYCLES OR THE LIKE
Oskar Pletscher, Marthalen, Switzerland, assignor to Gebrüder Pletscher, Marthalen, Switzerland
Filed Aug. 2, 1976, Ser. No. 710,810
Claims priority, application Switzerland, Feb. 20, 1976, 62544/76
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—158

249,677
TRUCK TAILGATE
Ted L. Cline, Box 37, Rush Springs, Okla. 73082
Filed Mar. 11, 1977, Ser. No. 776,878
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—196

249,678
MOLDED WHEEL
Jordan I. Rotheiser, Highland Park, Ill., assignor to American Wheel & Engineering Co., Inc.
Filed Nov. 2, 1976, Ser. No. 738,319
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—204

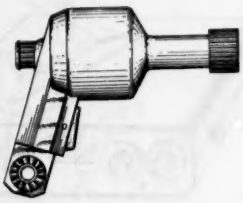


249,679
MOLDED WHEEL
Jordan I. Rotheiser, Highland Park, Ill., assignor to American Wheel & Engineering Co., Inc.
Filed Nov. 3, 1976, Ser. No. 738,556
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—204

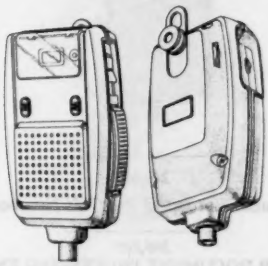


249,680
WHEEL
Bruce N. Smith, c/o Spherex Inc., Seabrook, N.H. 03874
Filed May 16, 1977, Ser. No. 797,590
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—205

249,681
BICYCLE LIGHT GENERATOR
Werner Glasenapp, and Jörg Glasenapp, both of Essen, Fed. Rep. of Germany, assignors to Union Sils, van de Loo & Co., Fröndenberg, Fed. Rep. of Germany
Filed Feb. 25, 1977, Ser. No. 771,941
Term of patent 14 years
Int. Cl. D13—*01*
U.S. Cl. D13—2

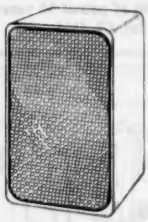


249,682
COMBINATION MICROPHONE, SPEAKER AND CONTROL UNIT FOR A RADIO TRANSCEIVER
Keizo Kushida, Hirakata; Kikuo Ohta, Katano; Munenori Fujimoto, Neyagawa, and Toshio Igo, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Jul. 1, 1977, Ser. No. 812,306
Claims priority, application Japan, Jan. 12, 1977, 52-707
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. 14—12



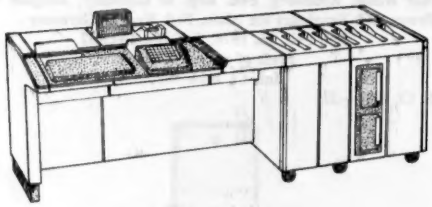
249,683
LOUDSPEAKER
Dieter Rams, Kronberg, Fed. Rep. of Germany, assignor to Braun AG, Frankfurt am Main, Fed. Rep. of Germany
Filed Feb. 26, 1976, Ser. No. 661,637
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—33

249,684
LOUDSPEAKER
Dieter Rams, Kronberg, Taunus, Fed. Rep. of Germany, assignor to Braun A G, Frankfurt am Main, Fed. Rep. of Germany
Filed Jun. 7, 1976, Ser. No. 693,278
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—33

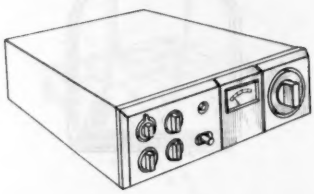


249,685
Patent Not Issued For This Number

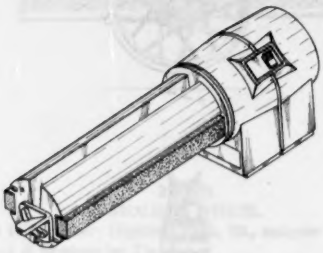
249,686
MODULAR DOCUMENT PROCESSING ENCODER
Richard G. Clayton, Detroit, and Robert C. Schade, Farmington Hills, both of Mich., assignors to Burroughs Corporation, Detroit, Mich.
Continuation-in-part of Ser. No. 574,724, May 5, 1975, abandoned. This application Jun. 24, 1976, Ser. No. 699,429
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—44



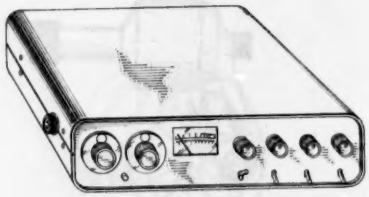
249,687
RADIO TRANSCEIVER AND THE LIKE
Kazuyoshi Imazeki, Tokyo, Japan, assignor to General Research of Electronics, Inc., Tokyo, Japan
Filed Jan. 4, 1977, Ser. No. 756,631
Term of patent 14 years
Int. Cl. 14—*03*
U.S. Cl. D14—68



249,688
PAPER TAKE-UP REEL FOR WEB FED FACSIMILE TRANSCEIVER OR THE LIKE
Robert E. Hughes, Lewisville, Tex., assignor to Xerox Corporation, Stamford, Conn.
Filed May 25, 1976, Ser. No. 689,769
Term of patent 14 years
Int. Cl. D14—*99*
U.S. Cl. D14—94

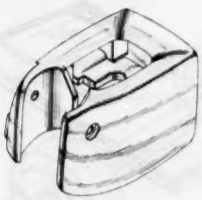


249,689
CB RADIO TRANSCEIVER
David S. Wisherd, Monte Sereno; Stephen L. Mieth, and Larry H. Mitchell, both of Los Gatos, all of Calif., assignors to Communications Power, Inc., Mountain View, Calif.
Filed Nov. 15, 1976, Ser. No. 741,860
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—94



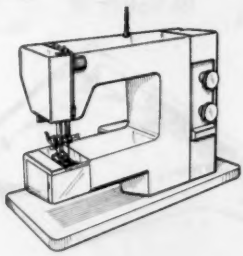
249,690
LAWN MOWER
George A. Thomas, Des Moines, Iowa, assignor to AMF Incorporated, White Plains, N.Y.
Filed Jan. 21, 1977, Ser. No. 761,043
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—14

249,691
GUIDING AND LOCKING DEVICE FOR ELECTRICAL CORDS
Earl R. Clowers, Anderson; John C. Davis, Greenwood, and Fred E. Pearman, Five Forks Community, all of S.C., assignors to The Singer Company
Filed Mar. 10, 1977, Ser. No. 776,155
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—62

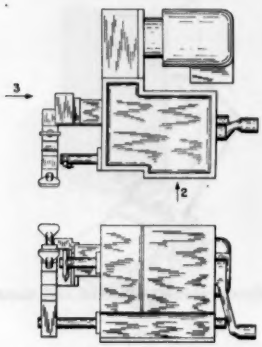


249,692
PUSH SWEEPER
Eugene L. Bothun, Berthoud, Colo., assignor to Clarke-Gravely Corporation, Muskegon, Mich.
Filed Feb. 4, 1976, Ser. No. 655,007
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—50

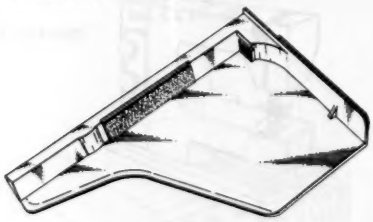
249,693
SEWING MACHINE
Takahiko Kasahara; Sigeharu Shichi, both of Anjo; Masayuki Kato, Owariasahi, and Senji Suito, Kariya, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan
Filed Aug. 10, 1976, Ser. No. 713,205
Claims priority, application Japan, Feb. 12, 1976, 51-4356
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D15—68



249,694
KEY CUTTING MACHINE
John H. Sagarian, c/o Worcester General Repair, 43 Chandler St., Worcester, Mass. 01605
Filed Jun. 4, 1976, Ser. No. 692,906
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—125

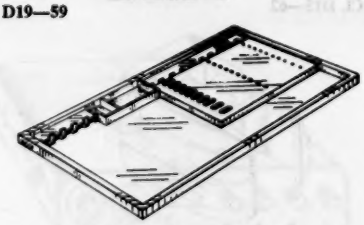


249,695
REMOVABLE UNDERSIZE SHEET EDGE GUIDE SHEET FEED CASSETTE
Craig A. Smith, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Aug. 23, 1976, Ser. No. 716,721
Term of patent 14 years
Int. Cl. D16—*99*
U.S. Cl. D16—32

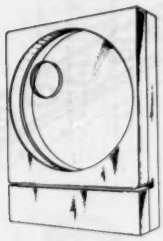


249,696
BALL POINT PEN
Walter Henkels, Holunderweg 1, 5142 Hilckelhoven, Germany
Filed Feb. 26, 1976, Ser. No. 661,523
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—45

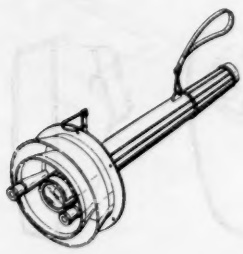
249,697
COMBINED EDUCATIONAL GAME BOARD AND COUNTING BOARD FOR TEACHING FUNDAMENTALS OF ARITHMETIC
Gene A. Hester, 1045 Shook No. 164, San Antonio, Tex. 78212, and Olga Dominguez, P.O. Box 433 (115 Scott St.), San Marcos, Tex. 78666
Filed Apr. 21, 1976, Ser. No. 678,924
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—59



249,698
SCENTED FLUID APPLICATOR FOR PAPER CURRENCY
Ronald M. Stephens, 305-1400 Camosun, Victoria, British Columbia, Canada (V8V 4L4)
Filed Feb. 14, 1977, Ser. No. 768,387
Term of patent 14 years
Int. Cl. D19—*99*
U.S. Cl. D19—65

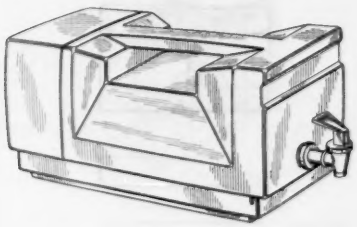


249,699
HAND CASTER
Richard Lapinski, 23 Norfolk Ave., Fairfield West, New South Wales, Australia (2165)
Filed Apr. 21, 1977, Ser. No. 789,705
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—25

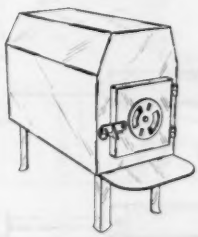


249,700
COMBINED TRANSPARENT CHARGING TUBE AND BASE FOR USE WITH A GUNPOWDER FLASK
Hugh R. Wilson, 10840 SW. 120th St., Miami, Fla. 33176
Filed Jan. 26, 1976, Ser. No. 652,339
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—99

249,701
WATER PURIFICATION UNIT
Paul Douglas Maples, Solana Beach; Ralph Edward Ropp, Los Angeles, and Peter Paul Klepa, Tujunga, all of Calif., assignors to Paul Douglas Maples, Solana Beach, Calif.
Filed Feb. 2, 1977, Ser. No. 764,831
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—3



249,702
WOOD STOVE
Jay Michael Dugan, R.F.D. 1, Brooks, Me. 04921
Filed Jul. 25, 1977, Ser. No. 818,618
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—93



249,703

COVER FOR ROOFTOP AIR INTAKE FOR VEHICLES

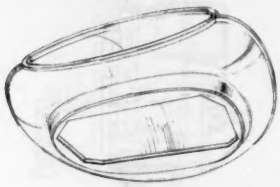
Alan Ross Zimmerman, and Benjamin Charles Baugh, both of Wichita, Kans., assignors to The Coleman Company, Inc., Wichita, Kans.

Filed Dec. 10, 1976, Ser. No. 749,290

Term of patent 14 years

Int. Cl. D23—*04;* D12—*16*

U.S. Cl. D23—142



249,704

COMBINED VENT AND BLOCK BAFFLE

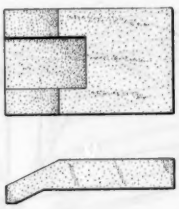
Bruce K. Ward, 2904 Virginia Ave., St. Louis Park, Minn. 55426

Filed Dec. 13, 1976, Ser. No. 749,834

Term of patent 14 years

Int. Cl. D23—*04*

U.S. Cl. D23—163



249,705

DEVICE FOR USE IN IMPLANTING A PROSTHESIS IN THE HUMERUS

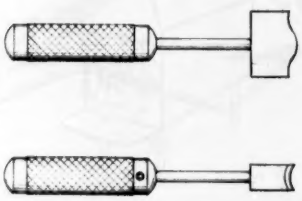
James T. London, 429 Via Anita, Redondo Beach, Calif. 90277

Filed May 20, 1977, Ser. No. 799,076

Term of patent 14 years

Int. Cl. D24—*02*

U.S. Cl. D24—26



249,706

SAMPLE CUP TRAY FOR CHEMICAL ANALYSIS OF BIOLOGICAL FLUIDS

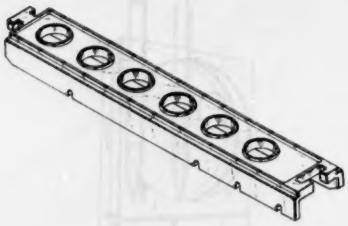
Henry Stanislaus Adamski, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 17, 1976, Ser. No. 751,929

Term of patent 14 years

Int. Cl. D24—*01, 02*

U.S. Cl. D24—32



249,707

MOISTURIZING MASSAGER

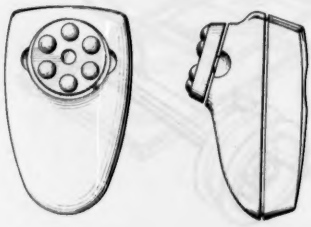
Frederick A. Burke, Riverside, and Douglas A. Long, Wilton, both of Conn., assignors to Clairol Inc.

Filed Apr. 26, 1976, Ser. No. 679,959

Term of patent 14 years

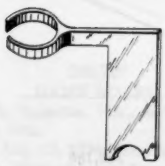
Int. Cl. D28—*03*

U.S. Cl. D24—41

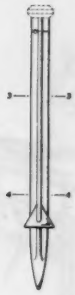


249,708
SAMPLE CUP FOR ANALYSIS OF BIOLOGICAL FLUIDS
Michael Richmond Smith; James Elias Ferris, both of Rochester, and Henry Stanislaus Adamski, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Dec. 17, 1976, Ser. No. 751,928
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—56

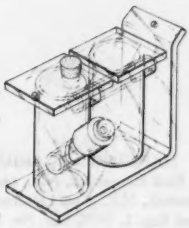
249,709
EYE DROP BOTTLE GUIDE
Douglas J. Trovinger, 311 Audubon Dr., Lodi, Calif. 95240
Filed Nov. 22, 1976, Ser. No. 743,809
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—99



249,710
LINK CHAIN SUPPORT POST
Michael T. Russo, 2520 Alveston, Bloomfield Hills, Mich. 48013
Filed Jul. 6, 1976, Ser. No. 702,971
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—78

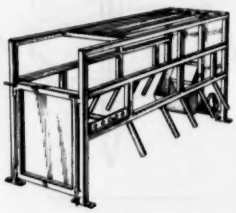


249,711
WATER PIPE
Robert W. Flesher, 628 Round Oak Rd., Towson, Md. 21204
Filed Sep. 7, 1976, Ser. No. 720,957
Term of patent 14 years
Int. Cl. D27—*02*
U.S. Cl. D27—03

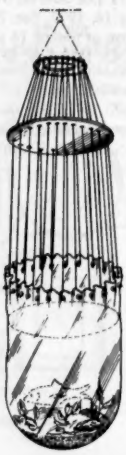


249,712
COMBINATION COASTER AND ASHTRAY
Joseph R. Dolezal, 1511 Lee Shores, St. Louis, Mo. 63125
Filed May 16, 1977, Ser. No. 797,046
Term of patent 14 years
Int. Cl. D27—*03*; D7—*06*
U.S. Cl. D27—21

249,713
FARROWING CRATE
Glen A. Gilbertson, Hoffman, Minn. 56339
Filed Apr. 14, 1977, Ser. No. 787,595
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—1



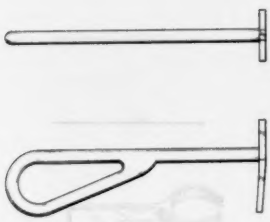
249,714
HANGING AQUARIUM
Beth E. Mandel, East Brunswick, N.J., assignor to Doris Mandel, East Brunswick, N.J., a part interest
Filed Sep. 1, 1977, Ser. No. 829,785
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



249,715
PIG WATERER
Lyle W. Lage, Gladbrook, Iowa 50635
Filed Sep. 8, 1977, Ser. No. 831,609
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—15

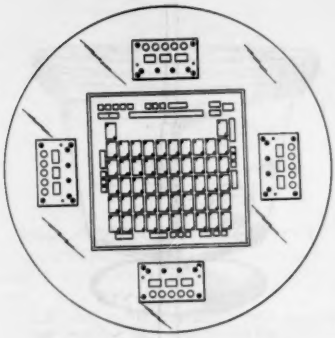
249,716
Patent Not Issued For This Number

249,717
HOOF CLEANER
Carlo J. Moran, 4340 Cinnabar, Dallas, Tex. 75227
Filed Oct. 5, 1977, Ser. No. 839,788
Term of patent 14 years
Int. Cl. D30—*99*
U.S. Cl. D30—99

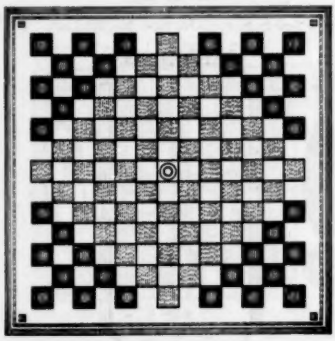


249,718
PROJECTOR FOR TOY GOLF CLUG BALLS OR THE LIKE
Otto G. Arndt, and James J. Arndt, both of 1708 S. Dahlia St., Denver, Colo. 80222
Filed Feb. 6, 1976, Ser. No. 655,886
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 CB

249,719
GAME BOARD
George C. Hadjis, 28009 Montereina Dr., San Pedro, Calif. 90732
Filed Jul. 16, 1976, Ser. No. 705,752
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



249,720
GAME BOARD
William E. Morris, Appleton, Wis., assignor to Super Games Inc., Green Bay, Wis.
Filed Aug. 13, 1976, Ser. No. 714,109
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



249,721
TOY ANIMAL FIGURE
Shigeru Saitoh, No. 6-4, 2-chome, Kuramae Taito-ku, Tokyo, Japan
Filed Sep. 9, 1976, Ser. No. 722,333
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 B

249,722
PLAYING PIECE FOR GAME
Michael A. Cosman, Kearns, Utah, assignor to Ernest Lynn Balmforth, Salt Lake City, Utah
Filed Sep. 23, 1976, Ser. No. 725,702
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 GP

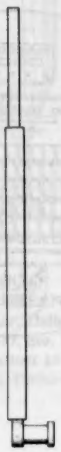
249,723
PLAYING PIECE FOR GAME
Michael A. Cosman, Kearns, Utah, assignor to Ernest Lynn Balmforth, Salt Lake City, Utah
Filed Sep. 23, 1976, Ser. No. 725,703
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 GP

249,724
PLAYING PIECE FOR GAME
Michael A. Cosman, Kearns, Utah, assignor to Ernest Lynn Balmforth, Salt Lake City, Utah
Filed Sep. 23, 1976, Ser. No. 725,704
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 GP

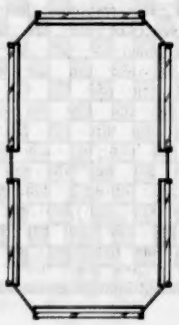
249,725
PLAYING PIECE FOR GAME
Michael A. Cosman, Kearns, Utah, assignor to Ernest Lynn Balmforth, Salt Lake City, Utah
Filed Sep. 23, 1976, Ser. No. 725,705
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 GP

249,726
PLAYING PIECE FOR GAME
Michael A. Cosman, Kearns, Utah, assignor to Ernest Lynn Balmforth, Salt Lake City, Utah
Filed Sep. 23, 1976, Ser. No. 725,983
Term of patent 14 years
Int. Cl.[2] D21—*01*
U.S. Cl. D34—5 GP

249,727
HOOP ROLLER
Joseph Soos, 313 Walker St., Tiltonsville, Ohio 43963
Filed Sep. 24, 1976, Ser. No. 726,254
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 HP

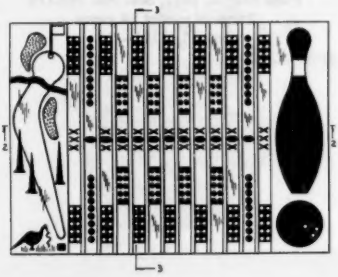


249,728
LAWN POOL TARGET FRAME
Donald P. Fried, 7895 Landale Ave., Dublin, Calif. 94566
Filed Nov. 22, 1976, Ser. No. 744,132
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 NN



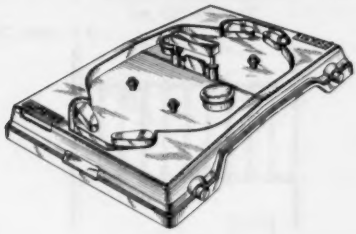
249,729
COMBINED VIDEO GAME AND TABLE
Verl O. Olson, La Mesa, Calif., assignor to Gremlin Industries, Inc.
Filed Dec. 13, 1976, Ser. No. 749,786
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 J

249,730
REUSABLE GOLF AND BOWL HAND SCOREPLATE
John T. Linton, 43 Bond St., Dayton, Ohio 45405
Filed Jan. 17, 1977, Ser. No. 760,071
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 MM



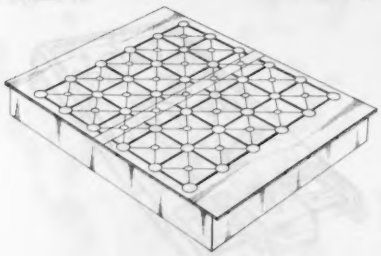
249,731
PINBALL GAME CABINET
Michael Langieri, Butler, N.J., assignor to Louis Marx & Co., Inc., Stamford, Conn.
Filed Feb. 10, 1977, Ser. No. 767,255
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 JJ

249,732
TABLE BALL GAME CABINET
Keith D. Patterson, Stamford, Conn., assignor to Louis Marx & Co., Inc., Stamford, Conn.
Filed Feb. 10, 1977, Ser. No. 767,256
Term of patent 14 years
Int. Cl.[2] D21—*01*
U.S. Cl. D34—5 JJ

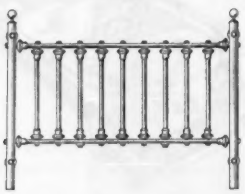


249,733
TABLE TENNIS RACKET
Carmen Zabaldo, 13080 Tripoli St., Sylmar, Calif. 91342
Filed Mar. 3, 1977, Ser. No. 774,029
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SP

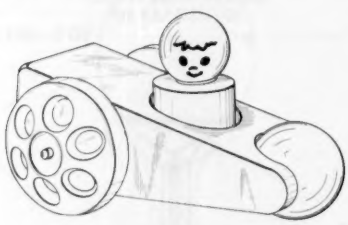
249,734
GAME BOARD
James L. Morgan, 3411 Altura St., Los Angeles, Calif. 90031
Filed Feb. 11, 1977, Ser. No. 767,964
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



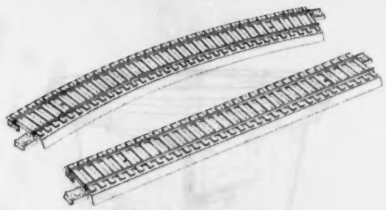
249,735
TOY CRIB
Norman Nelson, Southington, Conn., assignor to Nelson Tool & Machine Company, Inc., Southington, Conn.
Filed Jul. 12, 1976, Ser. No. 704,290
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AC



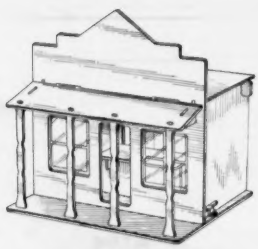
249,736
WHEELED TOY AND FIGURE THEREFOR
Andrew I. Bergman, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Oct. 29, 1976, Ser. No. 737,176
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AN



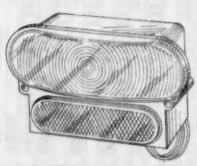
249,737
TOY RAILWAY TRACK
Ducan Tong, Hong Kong, Hong Kong, assignor to Playart Limited, Hong Kong, Hong Kong
Filed Dec. 27, 1976, Ser. No. 754,809
Claims priority, application United Kingdom, Jul. 8, 1976, 976377/76
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 MM



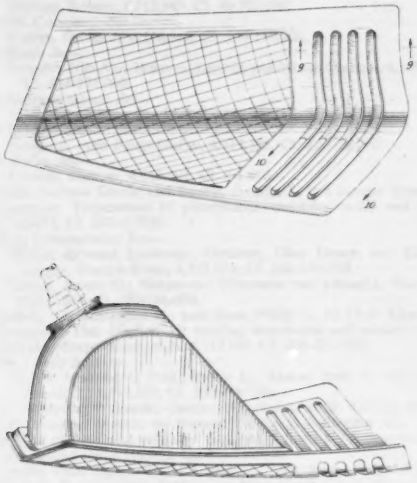
249,738
TOY STORE
William Donald Gordon, Sr., Glenview, Ill., assignor to Arvey Corporation, Chicago, Ill.
Filed Jan. 31, 1977, Ser. No. 763,882
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 LL



249,739
VEHICLE LAMP
Dennis G. Moore, 576 Debra, Livermore, Calif. 94550
Filed May 2, 1977, Ser. No. 793,178
Term of patent 14 years
Int. Cl.[2] D26—*06*
U.S. Cl. D48—32 R



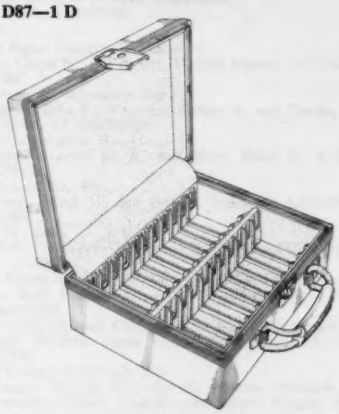
249,740
LEADING EDGE LIGHT FOR A MOTORCYCLE FAIRING
Craig W. Vetter, Rantoul, Ill., assignor to Vetter Fairing Company, San Luis Obispo, Calif.
Filed May 31, 1977, Ser. No. 802,239
Term of patent 14 years
Int. Cl.[2] D26—*06*
U.S. Cl. D48—32 E



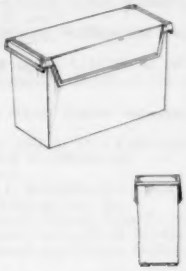
249,741
Patent Not Issued For This Number

249,742
ELECTRONIC CALCULATING MACHINE
Yoshihisa Ohie, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Sep. 6, 1977, Ser. No. 831,067
Claims priority, application Japan, Mar. 10, 1977, 52-9105
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B

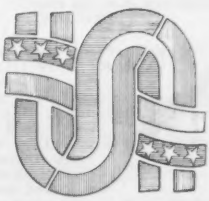
249,743
CARRYING CASE FOR TAPE CARTRIDGES AND CASSETTES
Joseph L. Berkman, 48 Country Rd., Mamaroneck, N.Y. 10543
Filed Feb. 15, 1974, Ser. No. 442,776
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 D



249,744
FILE BOX
George Lyman, Weston, Mass., assignor to Data Packaging Corporation, Cambridge, Mass.
Filed Apr. 1, 1976, Ser. No. 672,778
Term of patent 14 years
Int. Cl.[2] D19—*02*
U.S. Cl. D87—1 R



249,745
SIGN
Adam Pasternakiewicz, 2428-N. Bernard St., Chicago, Ill. 60647
Filed Apr. 22, 1977, Ser. No. 789,988
Term of patent 14 years
Int. Cl.[2] D20—*03*
U.S. Cl. D96—12 E



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 26TH DAY OF SEPTEMBER, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. & E. Warbern, Inc.: *See*—
Phillips, Robert, 4,115,940, Cl. 40-322.000.

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Calder, Oliver J., 4,116,386, Cl. 239-119.000.

AB Kabi: *See*—
Jonsson, Nils Ake; Mikiver, Lembit; and Moses, Pinchas, 4,117,144, Cl. 424-274.000.

AB Scaniainventor: *See*—
Comstedt, Anders Per Philip, 4,117,408, Cl. 328-133.000.

AB Svetsia: *See*—
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AB Welin: *See*—
Ewards, Gunnar, 4,115,887, Cl. 9-1.600.

Abbott, Andrew Doyle; and Benoit, George J., to Chevron Research Company. Preparation of phosphorus-containing acids and salts. 4,116,871, Cl. 252-32.70E.

Abbott Laboratories: *See*—
Hillier, Edward Lawrence; Graham, Glen Henry; and Eichelberger, Warren Evan, 4,117,035, Cl. 260-876.00B.
Pernet, Andre G.; Nakamoto, Hiromasa; and Ishizuka, Naoyasu, 4,117,014, Cl. 260-586.00R.

Abdallah, Abdulmuniem H.; and Shea, Philip J., to Dow Chemical Company, The. Method for treating depression and anxiety using phenyl hydrazo compounds. 4,117,146, Cl. 424-273.00R.

Abdou, John J.: *See*—
Taylor, Maurice J.; Peek, Henry L.; Abdou, John J.; and Patel, Amrut R., 4,117,289, Cl. 200-148.00B.

Abe, Nobuyuki; Watanabe, Osamu; Nunokawa, Koji; Tanaka, Ichiro; and Manabe, Masao, to Nippon Concrete Industries Co., Ltd. Method of obtaining sufficient supporting force for a concrete pile sunk into a hole. 4,116,012, Cl. 405-238.000.

Abramov, Ivan Egorovich; Gershanov, Felix Borisovich; Dolidze, Vladimir Romanovich; Zakharova, Nina Vasilievna; Liakumovich, Alexandr Grigorievich; Michurov, Jury Ivanovich; Popov, Vasily Dmitrievich; Rutman, Grigory Iosifovich; and Shalimova, Zoya Stepanovna. Method of producing 2,6-ditertbutyl-4-methylphenol. 4,117,244, Cl. 568-799.000.

Acevedo, Hernan F.: *See*—
Dalbow, Milton H.; Acevedo, Hernan F.; and Slifkin, Malcolm, 4,116,776, Cl. 195-103.700.

ACF Industries, Incorporated: *See*—
Diehl, Robert J.; and Houlgrave, Robert C., 4,116,419, Cl. 251-196.000.
Evans, Willie V., 4,116,157, Cl. 116-125.000.

Ackerman, Leonard Stanley. Over running clutch. 4,116,314, Cl. 192-46.000.

Ackermann, Rolf; Felber, Wilfried; and Morlock, Gerhard, to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler. Process for the trans-esterification of acrylic and methacrylic esters. 4,117,238, Cl. 560-217.000.

Acorn Building Components, Inc.: *See*—
Dunstan, James M., 4,116,597, Cl. 425-110.000.

Acre, Sydney R.; and Lake, Marquis J., Sr., to Midland-Ross Corporation. Sequential valve for power brake unit. 4,116,218, Cl. 137-627.500.

Adamek, John A.; and Ziehm, Richard T., to Xerox Corporation. Duplex system and method for pre-collation copiers. 4,116,558, Cl. 355-24.000.

Adams, James Willian; and Reinke, Orville Harold, to American Can Company. Premoistened flushable wiper. 4,117,187, Cl. 428-286.000.

Adelstein, Gilbert W., to G.D. Searle & Co. 3,3,3-Triarylalkyl-4-phenylalkyl-4-hydroxy piperidines and related compounds. 4,116,963, Cl. 260-293.690.

Adler, Stuart L.; and Hunt, William O'Neil, to Permali, Incorporated; and Shields Rubber Corporation, part interest to each. Mine vehicle trolley pole. 4,116,312, Cl. 191-64.000.

Ado, Andrei Dmitrievich: *See*—
Mashkovsky, Mikhail Davydovich; Yakhontov, Leonid Nikolaevich; Ado, Andrei Dmitrievich; Kaminka, Mikhail Emmanuilovich; Mikhlina, Eva Evseevna; Vorobieva, Valentina Yakovlevna; Yanina, Anna Dmitrievna; and Komarova, Nadezhda Andreevna, 4,117,139, Cl. 424-267.000.

Adrion, Robert F.; Buck, Robert T.; and Eppes, William R., to Corning Glass Works. Automatic recording fluorometer/densitometer. 4,117,338, Cl. 250-461.00R.

Advanced Plastics Machinery Corporation: *See*—
Zecher, Robert F., 4,115,960, Cl. 51-422.000.

Advent Corporation: *See*—
Holman, Tomlinson M., II, 4,117,412, Cl. 330-107.000.

AEG-Elotherm, G.m.b.H.: *See*—
Gosger, Peter; Pott, Paul Gerhard; and Wolter, Bernd, 4,116,799, Cl. 204-224.00M.

Aeroflash Signal Corporation: *See*—
Fabry, Lloyd W.; and Brame, Thomas Vinton, 4,117,454, Cl. 340-81.00F.

Aerojet-General Corporation: *See*—
Kinghorn, John S.; Wagoner, Robert B.; and Turala, Alfred J., 4,116,358, Cl. 220-222.000.

Aeroquip Corporation: *See*—
Swander, Kenneth D., Jr.; and Sibley, Bruce D., 4,116,114, Cl. 92-130.00A.

Aerovironment Inc.: *See*—
Pankratz, David V.; and Wright, Bruce E., 4,116,067, Cl. 73-421.50R.

Aerpat A.G.: *See*—
Sheffield, David John; and Saxon, John William Charles, 4,116,036, Cl. 72-391.000.

Aesculap-Werke Aktiengesellschaft vormals Jetter & Scheerer: *See*—
Braun, Karl; Lacher, Rainer; and Pfeiffer, Willi, 4,116,200, Cl. 128-305.000.

Aftergut, Siegfried; and Cole, Herbert S., Jr., to General Electric Company. Dichroic liquid crystal compositions. 4,116,861, Cl. 252-299.000.

Agaltsov, Georgy Ivanovich: *See*—
Lezgintsev, Georgy Mikhailovich; Istoshin, Stanislav Jurievich; Belyavsky, Mikhail Anatolievich; Kontar, Evgeny Alexeevich; Koptyazhin, Nikolai Nikolaevich; Agaltsov, Georgy Ivanovich; Chernov, Boris Serafimovich; Ter-Saakov, Eduard Isaakovich; and Shkatov, Evgeny Petrovich, 4,116,069, Cl. 73-425.200.

Agence Nationale de Valorisation de la Recherche: *See*—
Leblanc, Jacques; Dambier, Gerard; Coron, Noel; and Moalic, Jean-Pierre, 4,116,063, Cl. 73-355.00R.

Agence Nationale de Valorisation de la Recherche (A N V A R): *See*—
Alais, Pierre M., 4,117,446, Cl. 340-1.00R.

Agency of Industrial Science & Technology: *See*—
Sano, Hiroshi, 4,117,075, Cl. 423-235.000.
Sawata, Shinji; Tani, Tatsuo; Tanaka, Tadayoshi; and Horigome, Takashi, 4,116,266, Cl. 165-105.000.
Yabe, Akira; and Honda, Koichi, 4,116,692, Cl. 96-27.00E.

AGFA-Gevaert, A.G.: *See*—
Hell, August; Kobusch, Wolfram; and Braun, Fritz, 4,115,981, Cl. 53-55.000.
Himmelmann, Wolfgang, 4,116,700, Cl. 96-111.000.
Wagensonner, Eduard, 4,116,552, Cl. 352-141.000.

Agui, Hideo: *See*—
Hisada, Yoshio; Maeda, Kiyoto; and Agui, Hideo, 4,117,136, Cl. 424-258.000.

Ahmed, Adel Abdel Aziz, to RCA Corporation. Switchable current amplifiers. 4,117,417, Cl. 330-288.000.

Air Medic, Inc.: *See*—
Keogh, Marvin J., 4,115,884, Cl. 5-82.00R.

Air Products and Chemicals, Inc.: *See*—
Bechara, Ibrahim S.; Carroll, Felix P.; Mascioli, Rocco L.; and Panchak, John R., 4,116,879, Cl. 252-426.000.
Shabi, Fuad Aboodi; and Hibberd, Richard Loxley, 4,116,164, Cl. 119-3.000.
Worman, Charles H., Jr., 4,117,220, Cl. 528-503.000.

Airpax Electronics Incorporated: *See*—
Harper, George Sullivan, 4,117,285, Cl. 200-76.000.

Airway Industries, Inc.: *See*—
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Aizawa, Eizi: *See*—
Takahashi, Yuzo; Wazima, Yoshimi; Nakada, Akira; Tanaka, Yasuyuki; Nagai, Katsumi; Takahashi, Nobuo; Matsuda, Hiroshi; Aizawa, Eizi; and Oyama, Shiro, 4,117,188, Cl. 428-36.000.

Akashi, Goro; Suzuki, Osamu; and Fujiyama, Masaaki, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,117,190, Cl. 428-325.000.

Akatsuka, Takao, to Toyota Jidosha Kogyo Kabushiki Kaisha. Oxygen sensor. 4,116,797, Cl. 204-195.00S.

Akiho, Kiyotake: *See*—
Gotoh, Hideo; Igarashi, Akira; Kobayashi, Reiko; and Akiho, Kiyotake, 4,117,199, Cl. 428-486.000.

Akisue, Osamu: *See*—
Katoh, Hiroshi; Onoe, Yasumitsu; Akisue, Osamu; and Mochinaga, Kishio, 4,116,729, Cl. 148-111.000.

Aktiebolaget Carl Munters: *See*—
Lindgren, Ake; and Lindahl, Sven, 4,116,603, Cl. 425-370.000.

Aktiebolaget Electrolux: *See*—
Busch, Charles R., 4,116,648, Cl. 55-276.000.

Al Muddarris, Ghazi Rashid: *See*—
Hellmer, Lars; Koller, Gerald; Al Muddarris, Ghazi Rashid; and Sud, Kuldip Kumar, 4,117,100, Cl. 423-569.000.

Alais, Pierre M., to Agence Nationale de Valorisation de la Recherche

(A N V A R). Devices for probing by ultrasonic radiation. 4,117,446, Cl. 340-1.00R.
Albert, William J., to Surgical Applicance Industries, Inc. Knee brace with kneecap-encircling flexible resilient pad. 4,116,236, Cl. 128-80.00C.
Albrecht, Leonard N., to Econolite Control Products Inc. Traffic signal housing. 4,117,456, Cl. 340-119.000.
Albright, Jay Donald: *See*—
Allen, George Rodger, Jr.; Hanifin, John William, Jr.; Moran, Daniel Bryan; and Albright, Jay Donald, 4,117,130, Cl. 424-250.000.
Albright & Wilson Ltd.: *See*—
Rooney, Terence R., 4,116,699, Cl. 106-3.000.
Alco Electronic Products, Inc.: *See*—
Kirchoff, Francis D.; and Washburn, Ellis K., 4,117,284, Cl. 200-67.00G.
Alderman, C. Gale. Dental crown and bridge shading system. 4,115,922, Cl. 32-71.000.
Aldrich, Darrell L. Panel and hinge assembly. 4,115,955, Cl. 49-261.000.
Alexanderson, Walter Howard, to Babcock & Wilcox Company, The. Low mass, high alumina-silica refractories. 4,117,055, Cl. 264-56.000.
Alexandrov, Vladimir Ilich; Osiko, Vyacheslav Vasilievich; Tatarintsev, Vladimir Mikhailovich; and Udovenchik, Viktor Timofeevich, to Fizichesky Institut Imeni P.N. Lebedeva Akademii Nauk SSSR. Apparatus for producing high-melting-metal-oxide-based crystalline materials. 4,116,598, Cl. 425-174.80R.
Ali, Mian Zaheer, to Communications Satellite Corporation. Configurable parallel arithmetic structure for recursive digital filtering. 4,117,541, Cl. 364-724.000.
Allasia, Alberto, to Ferrero Nahrungs-und Genussmittel GmbH. Glass jar with thread protector. 4,116,350, Cl. 215-31.000.
Allcorn, Seth Ford: *See*—
Stagemeyer, Merlin D.; and Allcorn, Seth Ford, 4,116,007, Cl. 405-66.000.
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Allen, George Rodger, Jr.; Hanifin, John William, Jr.; Moran, Daniel Bryan; and Albright, Jay Donald, to American Cyanamid Company. Method for treating anxiety in mammals. 4,117,130, Cl. 424-250.000.
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DeAngelis, William M., 4,116,836, Cl. 210-198.00C.
Allen, Roger E.: *See*—
Kruer, Melvin R.; Esterowitz, Leon; Bartoli, Filbert J.; and Allen, Roger E., 4,117,329, Cl. 250-338.000.
Allen, Thomas S.: *See*—
Hornbaker, Edwin D.; Jones, Jesse D.; Kucsma, Michael E.; and Allen, Thomas S., 4,116,922, Cl. 260-40.00R.
Alley, Don B., to Elevator Industries. Elevator car generator-motor-brake control unit apparatus and method. 4,116,306, Cl. 187-29.00R.
Alley, Robert P., to General Electric Company. Emergency/normal lighting circuit for a gaseous discharge lamp. 4,117,373, Cl. 315-86.000.
Allied Chemical Corporation: *See*—
Chlanda, Frederick P.; Lee, Lester T. C.; and Liu, Kang-Jen, 4,116,889, Cl. 521-27.000.
Gancy, Alan Brian; and Durling, Robert Edward, 4,116,629, Cl. 422-13.000.
Garofano, Norman R.; and Bitney, Ronald G., 4,116,757, Cl. 159-47.0WL.
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Minhas, Pritam S.; and Sukornick, Bernard, 4,116,931, Cl. 260-45.75B.
Smith, Robert E.; Chytil, Frank S.; Feldstein, George; and Swartz, Dorman J., 4,116,394, Cl. 242-25.00R.
Allis-Chalmers Corporation: *See*—
Berg, David A., 4,116,458, Cl. 280-474.000.
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Kreitzberg, Ernest A., 4,116,459, Cl. 280-474.000.
Mangiess, Vernon W., 4,116,484, Cl. 296-28.00C.
Taylor, Maurice J.; Peek, Henry L.; Abdou, John J.; and Patel, Amrut R., 4,117,289, Cl. 200-148.00B.
Allison, Anthony Clifford; and Gregoriadis, Gregory, to National Research Development Corporation. Immunological preparations. 4,117,113, Cl. 424-89.000.
Alps Electric Co., Ltd.: *See*—
Nakatogawa, Yoshio, 4,116,575, Cl. 403-265.000.
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Masuda, Akio, 4,116,084, Cl. 74-342.000.
Altmayer, John, to New-Tronics Corp. Radio antenna. 4,117,493, Cl. 343-750.000.
Alza Corporation: *See*—
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Amotz, Shmuel; Nielsen, Tage Kjaer; Poulsen, Poul Borge Rosenius; and Norman, Barrie Edmund, to Novo Industri A/S. Immobilized saccharifying enzyme product and process for preparation thereof. 4,116,771, Cl. 195-63.000.
AMP Incorporated: *See*—
Askman, Jan Philip, 4,117,326, Cl. 250-324.000.
Grabbe, Dimitry G.; and Sweeney, Joseph Patrick, 4,116,519, Cl. 339-17.0CF.
Herrmann, Henry Otto, Jr., 4,116,521, Cl. 339-60.00R.
Reynolds, Charles Edward, 4,116,522, Cl. 339-97.00R.
Woolley, Harold Oakley, Jr.; and Wise, Charles Richard, Jr., 4,115,919, Cl. 29-740.000.
Zimmerman, Gary Lee; Clark, Richard Paul; and Rehm, John A., 4,116,520, Cl. 339-59.00R.
Ampt, Cornelis Georg Frederik; and Keimpema, Keimpe Klaas, to De Staat der Nederlanden, Te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie. Radioactive dose calculating device. 4,117,315, Cl. 235-88.00R.
Anantha, Narasipur Gundappa; Cases, Moises; Chang, Fung Yuel; and Rubin, Barry Jay, to International Business Machines Corporation. Interlaced CCD memory. 4,117,546, Cl. 365-233.000.
Anderl, Richard F.; and Tienor, Lawrence J., to National Presto Industries, Inc. Method of making electric appliance with intermittently staked sheathed heating element. 4,115,918, Cl. 29-611.000.
Andersen, Peter A. Collapsible book stand. 4,116,413, Cl. 248-451.000.
Anderson, Charles Hammond: *See*—
Marlowe, Frank Jerome; and Anderson, Charles Hammond, 4,117,368, Cl. 313-422.000.
Anderson Development Company: *See*—
Meyer, Jeffrey G., 4,117,022, Cl. 260-669.00P.
Anderson, Donald P.: *See*—
Englander, Gary E.; Chase, Richard P.; Anderson, Donald P.; and Metcalf, Guy D., 4,115,958, Cl. 51-289.00R.
Anderson, Joseph A.; and Neukom, Chester G., to Haybuster Manufacturing, Inc. Press wheel depth control for grain drill furrow openers. 4,116,140, Cl. 111-52.000.
Anderson, Richard J.: *See*—
Cohen, Richard L.; and Anderson, Richard J., 4,117,386, Cl. 318-664.000.
Anderson, Richard N., to V. E. Anderson Mfg. Co. Building structure. 4,115,973, Cl. 52-773.000.
Anderson, Robert E.: *See*—
Johnson, Ben C.; Thornton, J. Scott; Glowe, Donald E.; Cassidy, Patrick E.; and Anderson, Robert E., 4,117,312, Cl. 219-548.000.
Anderson, Robert J.: *See*—
Lillig, John E.; Meyer, Richard C.; and Anderson, Robert J., 4,117,414, Cl. 330-149.000.
Anderson, Victor C.: *See*—
Fisher, Frederick H.; and Anderson, Victor C., 4,116,153, Cl. 114-244.000.
Anderson, William S., to United Technologies Corporation. Catalysts for the ammonolysis of pentaerythrityl tetrachloride. 4,117,013, Cl. 260-585.00A.
Andersson, Maj; and Lagher, Gunnar, to Maj Andersson Arkitektkontor AB. Mixer unit with thermostat-controlled valves. 4,116,377, Cl. 236-12.00A.

Ando, Bunichi: *See*—
Kitamura, Chiharu; and Ando, Bunichi, 4,116,078, Cl. 74-10.270.
Ando, Shigenori: *See*—
Moritomo, Sadao; and Ando, Shigenori, 4,116,506, Cl. 308-189.00A.
Ando, Shizuo, to Pioneer Electronic Corporation. Start circuit for telephone answering device. 4,117,272, Cl. 179-84.00R.
Andre, Eugene R. Multi-part pressure chuck. 4,116,453, Cl. 279-4.000.
Andreev, Chavdar Andreev: *See*—
Nikolov, Ivan Dimov; Rashev, Tzolo Valkov; Ivanov, Rangel Petrov; and Andreev, Chavdar Andreev, 4,116,683, Cl. 75-125.000.
Andrews, Peter. Electric energy saving incandescent lamp socket combination switching device. 4,117,376, Cl. 315-200.00R.
Andrews, Ray, to Commercial Decal, Inc. Heat release layer for decalcomanias. 4,117,182, Cl. 428-201.000.
Anheuser-Busch, Incorporated: *See*—
Musselman, Camillus B.; and Bovier, Edward M., 4,116,740, Cl. 156-205.000.
Anic, S.p.A.: *See*—
Cipriani, Gioacchino; and Neri, Carlo, 4,116,997, Cl. 260-463.000.
De Simone, Renato; Platone, Edoardo; and Morelli, Morello, 4,117,249, Cl. 568-855.000.
Generini, Gianni, 4,116,783, Cl. 204-150.000.
Antipova, Antonina Petrovna: *See*—
Tikhova, Nina Mikhailovna; Blokhina, Valentina Alexeevna; Antipova, Antonina Petrovna; and Vasilieva, Tamara Pavlovna, 4,116,731, Cl. 148-161.000.
Antrim, Richard Douglas, to USM Corporation. Extruder seal. 4,117,549, Cl. 366-99.000.
Anzai, Makoto, to Nissan Motor Company, Limited. Electronic closed loop control system for internal combustion engine. 4,116,170, Cl. 123-32.0EE.
Appel, Adolf; Horwege, Claus; Reymann, Wolfgang; and Rosenkranz, Otto, to Gildemeister Corpoplast GmbH. Method for heating and blow molding plaster parisons. 4,117,050, Cl. 264-25.000.
Appelquist, Jan Olov; and Lindwall, Conny Holger, to U.S. Philips Corporation. Safety arrangement for microwave ovens. 4,117,294, Cl. 219-10.55C.
Appleford, David Dale; and Warwick, Paul Stephen, to Monsanto Company. Hardness tester. 4,116,048, Cl. 73-83.000.
Appleton, Anthony Derek: *See*—
Parton, Kenneth Charles; Appleton, Anthony Derek; and Bartram, Trevor Carlisle, 4,117,524, Cl. 361-19.000.
Applied Plastics Co., Inc.: *See*—
Firth, Francis G., 4,116,742, Cl. 156-289.000.
Arai, Kiyotaka: *See*—
Yamabe, Masaaki; Arai, Kiyotaka; Samejima, Shunichi; and Noshiro, Makoto, 4,116,977, Cl. 260-343.600.
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Arbib, Richard, to Richard Arbib Company, Inc. Lamp shade construction and method. 4,117,532, Cl. 362-358.000.
Archifar Industrie Chimiche del Trentino S.p.A.: *See*—
Rossetti, Vittorio; Marsili, Leonardo; and Pasqualucci, Carmine, 4,116,957, Cl. 260-239.30P.
ARCO Polymers, Inc.: *See*—
Pillar, Walter O., 4,117,178, Cl. 521-60.000.
Arendt, Ronald H.; and Aubourg, Patrick F., to General Electric Company. Silicon-iron production and composition and process therefor. 4,116,730, Cl. 106-113.000.
Argus Chemical Corporation: *See*—
Minagawa, Motonobu; Kubota, Naohiro; and Shibata, Toshihiro, 4,116,927, Cl. 260-45.8NZ.
Armour Pharmaceutical Company: *See*—
Reichenbacher, Frank W., 4,115,928, Cl. 34-5.000.
Somkaite, Rozalija; and Toth, Bela, 4,116,824, Cl. 209-262.000.
Armstrong Cork Company: *See*—
Cogley, Robert W., Jr., 4,116,072, Cl. 73-433.000.
Dieck, Ronald L.; Garrett, Thomas B.; and Magnusson, Alan B., 4,116,891, Cl. 521-89.000.
Armstrong, Desmond R., to U.S. Philips Corporation. Tachogenerator processing circuits and motor speed control systems including such circuits. 4,117,384, Cl. 318-326.000.
Armstrong, Maclay M., to Northwest Orthodontics, Inc. Extraoral force-applying orthodontic appliance. 4,115,921, Cl. 32-14.00D.
Arnold, James J., deceased (by Arnold, Susan, executrix); Campbell, Donn V.; DeSantis, Charles M.; and Schwering, Felix, to United States of America, Army. Inconspicuous antenna system employing the airframe as an antenna. 4,117,490, Cl. 343-708.000.
Arnold, James J., deceased (by Arnold, Susan, executrix); and Campbell, Donn V., to United States of America, Army. Low profile remotely tuned dipole antenna. 4,117,492, Cl. 343-747.000.
Arnold, Susan, executrix: *See*—
Arnold, James J., deceased; Campbell, Donn V.; DeSantis, Charles M.; and Schwering, Felix, 4,117,490, Cl. 343-708.000.
Arnold, James J., deceased; and Campbell, Donn V., 4,117,492, Cl. 343-747.000.
Aronova, Irina Zelmanovna: *See*—
Oborin, Pavel Alexandrovich; Gadaev, Anatoly Yakovlevich; Bikbau, Marsel Yanovich; Nudelman, Boris Izrailovich; Aronova, Irina Zelmanovna; Bulatov, Nail Yakubovich; and Sosenko, Lev Matveevich, 4,116,707, Cl. 106-104.000.
Arrington, Bradford Lee. Milling liner. 4,116,165, Cl. 119-14.470.
Arrow Pneumatic, Inc.: *See*—
Draxler, Walter E., 4,116,156, Cl. 116-70.000.
Arthur G. McKee & Company: *See*—
Greaves, Melvin J.; and Razgaitis, Frank V., 4,116,345, Cl. 214-37.000.
Arvin Industries, Inc.: *See*—
Stratton, Boyd Lehman; and Nichols, William E., 4,117,521, Cl. 360-99.000.
ASA S.A.: *See*—
Venot, Jean, 4,115,985, Cl. 57-34.0HS.
Asaga, Ryuzi. Internal combustion engine. 4,116,189, Cl. 123-190.0BB.
Asagao, Soichi: *See*—
Fujita, Yoshishige; Asagao, Soichi; and Ogura, Motoshige, 4,117,089, Cl. 423-306.000.
Asahi Glass Company Ltd.: *See*—
Ukihashi, Hiroshi; Asawa, Tatsuro; Yamabe, Masaaki; and Miyake, Haruhisa, 4,116,888, Cl. 521-31.000.
Yamabe, Masaaki; Arai, Kiyotaka; Samejima, Shunichi; and Noshiro, Makoto, 4,116,977, Cl. 260-343.600.
Asai, Akira: *See*—
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Asai, Yuichi: *See*—
Hishida, Yukio; Asai, Yuichi; Kondo, Toshikatsu; Asai, Akira; Sakaida, Atsuo; and Miyazawa, Chiaki, 4,117,435, Cl. 335-270.000.
Asakawa, Motoo: *See*—
Okamoto, Toyohiko; Misaka, Yoshisuke; and Asakawa, Motoo, 4,116,028, Cl. 72-21.000.
Asawa, Tatsuro: *See*—
Ukihashi, Hiroshi; Asawa, Tatsuro; Yamabe, Masaaki; and Miyake, Haruhisa, 4,116,888, Cl. 521-31.000.
Ascoli, Enzo, to Gillette Company, The. Dry shaver with primary and secondary modes of oscillation. 4,115,920, Cl. 30-43.300.
ASEA Aktiebolag: *See*—
Ottesen, Otto, 4,117,437, Cl. 336-69.000.
Ashfield, Herbert Edward, to David Brown Tractors Limited. Clutches. 4,116,322, Cl. 192-48.800.
Ashtabula Development Co.: *See*—
Wheeler, Charles Joseph, 4,116,092, Cl. 81-9.50R.
Askadsky, Andrei Alexandrovich: *See*—
Korshak, Vasily Vladimirovich; Vinogradova, Svetlana Vasilievna; Storozhuk, Ivan Pavlovich; Valetsky, Petr Maximilianovich; Sokolov, Lev Borisovich; Mikitaev, Abdulakh Kazbulatovich; Askadsky, Andrei Alexandrovich; Kochergin, Jury Sergeevich; Slonimsky, Grigory Lvovich; Shirokova, Larisa Borisovna; Nebosenko, Ljudmila Fedorovna; and Zhuravlev, Nikolai Danilovich, 4,116,940, Cl. 528-173.000.
Askman, Jan Philip, to AMP Incorporated. Ion generator. 4,117,326, Cl. 250-324.000.
Associated Controls & Communications, Inc.: *See*—
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Atari, Inc.: *See*—
Mayer, Steven T.; and Milner, Ronald E., 4,116,444, Cl. 273-101.200.
Atchley, Raymond D.; Barr, John E.; and Pegram, John B., to Deval Industries, Inc. Component locating apparatus. 4,116,348, Cl. 214-309.000.
Ateliers Roannais de Constructions Textiles: *See*—
Bieniok, Joachim; and Crouzet, Henri, 4,115,986, Cl. 57-77.300.
Atlantic Richfield Company: *See*—
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Atun, Albert: *See*—
Gautier, Charles L.; DeLuca, Paul V.; and Atun, Albert, 4,117,273, Cl. 179-98.000.
Aubele, Richard: *See*—
Haberle, Heinz; and Aubele, Richard, 4,117,267, Cl. 179-15.0BS.
Aubourg, Patrick F.: *See*—
Arendt, Ronald H.; and Aubourg, Patrick F., 4,116,730, Cl. 106-113.000.
Aucktor, Erich; and Rubin, Wolfgang, to Lohr & Bromkamp GmbH. Constant velocity universal joint. 4,116,020, Cl. 64-21.000.
Augustine, Lloyd E. Communications device with plural, power-operated display mechanisms selectively controlled by an operator. 4,117,474, Cl. 340-325.000.
Ault, Cyrus Frank, to Bell Telephone Laboratories, Incorporated. Magnetic single-wall domain bias field control arrangement. 4,117,544, Cl. 365-28.000.
Aultz, Daniel Eugene: *See*—
McFadden, Arthur Raymond; and Aultz, Daniel Eugene, 4,117,152, Cl. 424-285.000.
Auphan, Michel Joseph, to U.S. Philips Corporation. Infrared radiation sensitive image pick-up device. 4,117,328, Cl. 250-330.000.
Automatic Equipment Development Corporation: *See*—
Johnston, James J., 4,116,525, Cl. 339-132.00B.
Automation Equipment Inc.: *See*—
Limbach, Walter S., II; and Kusic, George, 4,117,385, Cl. 318-578.000.
Automotive Products Limited: *See*—
Young, Alastair John, 4,116,309, Cl. 188-195.000.
Avco Corporation: *See*—
Rishton, Michael L., 4,116,589, Cl. 417-384.000.
Avera, Fitzhugh Lee. Non-dusting coloring agent and method of manufacture. 4,116,711, Cl. 106-309.000.

Avery, James E.: *See*—
Yerkes, John W.; and Avery, James E., 4,116,718, Cl. 136-89.0PC.

Avron, Mordhay; and Ben-Amotz, Ami, to Yeda Research and Development Company Ltd. Production of glycerol from algae. 4,115,949, Cl. 47-1.400.

Ayer, Atul D.: *See*—
Theeuwes, Felix; and Ayer, Atul D., 4,116,241, Cl. 128-260.000.

Ayers, Wayne R. Combination tire inflator and pressure gauge. 4,116,245, Cl. 141-98.000.

Azteca Corn Products Corporation: *See*—
Ellis, A. Barry, 4,116,330, Cl. 206-44.00R.

Azzani, Nino, to Ing. C. Olivetti & C., S.p.A. Transducer for measuring linear positions. 4,117,439, Cl. 336-129.000.

B. F. Goodrich Company, The: *See*—
Witenhafer, Donald Edward; and Popovich, David Thomas, 4,117,215, Cl. 526-62.000.
Witenhafer, Donald Edward; and Popovich, David Thomas, 4,117,216, Cl. 526-62.000.

Baba, Yoshihiko: *See*—
Minato, Sadamasa; Hattori, Atsushi; Baba, Yoshihiko; Yabe, Yuichiro; and Ueda, Seigo, 4,116,774, Cl. 195-99.000.

Babcock & Wilcox Company, The: *See*—
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Babler, Fridolin: *See*—
Mollet, Hans; Haberli, Roland; Rabassa, Alberto; and Babler, Fridolin, 4,117,066, Cl. 264-117.000.

Bacchi, Anthony C.; and Kress, Robert W., to Grumman Aerospace Corporation. Airplane. 4,116,405, Cl. 244-12.400.

Bacher, Helmut. Microwave step attenuator. 4,117,425, Cl. 333-81.00A.

Bachur, Gerald; and Richardson, George E., to Optical Associates, Incorporated. Exposure system. 4,117,375, Cl. 315-151.000.

Back, Gerhard: *See*—
Beffa, Fabio; Back, Gerhard; and Steiner, Eginhard, 4,116,952, Cl. 260-145.00B.

Backman, Torsten Lorentz; and Olsson, Sten Yngve, to Ingenjorsfirman Petrokraft AB. Device in burners, in particular rotary burners. 4,116,617, Cl. 431-186.000.

Backus, Harold Adams, to N L Industries, Inc. Impact absorbing means for shipping cask. 4,116,337, Cl. 206-591.000.

Baer, Ralph H.; and Cope, Leonard D., to Sanders Associates, Inc. Universal television interface and sync generator therefor. 4,117,511, Cl. 358-83.000.

Bailey, John; Randell, Michael John; and Sherrington, Paul Richard, to Procter & Gamble Company, The. Builders and built detergent copositions. 4,116,852, Cl. 252-135.000.

Bailey, Paul T.: *See*—
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Baker, David C.; and Putt, Sterling R., to Warner-Lambert Company. 2-Amino-1-(5-amino-1H-imidazol-4-yl)ethanone and method of preparation. 4,117,229, Cl. 548-301.000.

Baker, Don R.; and Walker, Francis H., to Stauffer Chemical Company. Thiolcarbamate sulfoxides stabilized with hindered phenols. 4,117,010, Cl. 260-561.00S.

Baker, Don R.; and Walker, Francis H., to Stauffer Chemical Company. N-(1,1-dimethyl-2-propynyl)-alpha-(substituted phenoxy) alkylamides and their use as miticides. 4,117,166, Cl. 424-324.000.

Baker, Don R.: *See*—
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Baker, Fred E., to General Electric Company. Securing means for cooking vessels. 4,116,363, Cl. 220-448.000.

Baker, Richard H., to Massachusetts Institute of Technology. Voltage waveform synthesizer and a system that includes the same. 4,117,364, Cl. 318-230.000.

Balcom, Orville. Marine ground isolator. 4,117,345, Cl. 307-95.000.

Balg, Theodorus; Cramers, Constant M. A.; and Maessen, Hendrikus J. G., to Stamicarbon, B.V. Process for preparing 4-oxocapronitrile. 4,117,000, Cl. 260-465.100.

Ballew, Audrey H., to Dallas County Association for the Blind. Mop construction. 4,115,895, Cl. 15-229.00R.

Ballou, John McK. Plant iron source, plant growing medium, and methods of making and using same. 4,116,663, Cl. 71-23.000.

Bammert, Karl; and Staude, Rudolf, to Gutehoffnungshutte Sterkrade AG. Device for extending the working range of axial flow compressors. 4,116,584, Cl. 415-199.500.

Bankwitz, Gottfried: *See*—
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Bar-On, Benjamin; and Paz, Eldad. Differential-temperature-sensitive device. 4,117,442, Cl. 337-397.000.

Barabas, Eugene S., to GAF Corporation. Gelling agent of water miscible organic liquids. 4,116,913, Cl. 260-29.60E.

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Takatsy, Gyula; Barb, Katalin; Muranyi, Istvan; and Burda, Ferencne, 4,116,777, Cl. 195-127.000.

Barbe, Gerard; and Habault, Robert, to Rhone-Poulenc-Textile. Bicomponent filaments with a special cross-section. 4,117,194, Cl. 428-374.000.

Barber, Antony Dobson; and Fisher, Zdenek, to Compair Construction and Mining Limited. Hydraulic levelling systems for drilling machines, etc. 4,116,409, Cl. 248-2.000.

Barber, Norman B., to Garnett-Bywater Limited. Processing of fibrous materials to reduce same to a generally homogeneous mass of fibers. 4,115,903, Cl. 19-99.000.

Barbour, William P., to Kile, Gholz, Bernstein & Georges, part interest to each. Method and plug for concealing fastener anchor. 4,116,106, Cl. 85-71.000.

Barchas, Richard K., to Lummus Company, The. Recovery of terephthalonitrile. 4,116,999, Cl. 260-465.00H.

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Barker, Lynn Marshall, to Terra Tek, Inc. Method for measuring plane strain fracture toughness. 4,116,049, Cl. 73-87.000.

Barker, Michael D.; and Barker, Eirlys R., to Shell Oil Company. Herbicidal tetrahydrofuran derivatives. 4,116,669, Cl. 71-88.000.

Barlis, Glenn A.: *See*—
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Barlow, Charles Brian; and Freeman, Peter Frank Hilary, to Imperial Chemical Industries Limited. Dinitroaniline derivatives. 4,117,167, Cl. 424-330.000.

Barnes, Theodore Marion; Shindelar, Joseph John; Bass, Merlyn Duane; and Suechting, Henry William, Jr., to Deere & Company. Row-crop harvesting header. 4,115,983, Cl. 56-98.000.

Barnett, Karl F., to Cadillac Products, Inc. Method of making a heat shrinkable bag. 4,116,116, Cl. 93-35.00R.

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BASF Wyandotte Corporation: *See*—
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Bash, Clayton W. Probe. 4,116,286, Cl. 175-19.000.

Basi, Jagtar Singh, to International Business Machines Corporation. Post-polishing semiconductor surface cleaning process. 4,116,714, Cl. 134-3.000.

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Bass, Robert John, to Pfizer Inc. 4-Oxo-4H-benzopyrans as animal growth promotants. 4,117,149, Cl. 424-283.000.

Bates, James T., to Tri-Venture. Undervoltage protection device. 4,117,526, Cl. 361-92.000.

Bates, Stephen Ronald, to EMI Limited. Computerized radiography with means to process only selected signals. 4,117,336, Cl. 250-445.00T.

Battelle Development Corporation: *See*—
Love, Robert Bruce; and Bowen, Alan W., 4,116,806, Cl. 204-298.000.

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Lee, John M.; and Bauman, William C., 4,116,857, Cl. 252-184.000.
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Baumann, Kai J., to Electric Power Research Institute, Inc. Flexible coupling for rotor elements of a superconducting generator. 4,117,357, Cl. 310-52.000.

Baumann, Manfred; Hoffmann, Werner; and von Fraunberg, Karl, to BASF Aktiengesellschaft. 3-Oximino-4-oxo-2,5-dimethyl-tetrahydrofuran. 4,116,982, Cl. 260-347.700.

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Moller, Eike; Meng, Karl-August, deceased; Wehinger, Egbert; Horstmann, Harald; and Seuter, Friedel, 4,117,145, Cl. 424-273.00P.
Stetter, Jorg; Hammann, Ingeborg; Homeyer, Bernhard; and Behrenz, Wolfgang, 4,117,154, Cl. 424-298.000.
Thoma, Wilhelm; Wulff, Jochen; and Niederdellmann, Georg, 4,116,741, Cl. 156-239.000.
BBC Brown, Boveri & Company Limited: *See—*
Horler, Hansulrich; Linsi, Ulrich; and Policke, Oswald, 4,116,502, Cl. 308-9.000.
Menth, Anton; Perry, Anthony J.; and Spinner, Ulrich, 4,116,726, Cl. 148-31.570.
Wicker, Helmut; Kielhorn, Werner; and Heyduk, Gerhard, 4,117,293, Cl. 219-10.410.
Beach, Shirley, to Phillips Cable Limited. Apparatus for annealing of wire. 4,117,295, Cl. 219-10.61R.
Beall, Glenn L.: *See—*
Eisenberg, Melvin I.; Levy, Norman; and Beall, Glenn L., 4,116,227, Cl. 128-2.00F.
Beard, Robert M.: *See—*
Walker, Raymond W.; and Beard, Robert M., 4,117,287, Cl. 200-82.00R.
Bechara, Ibrahim S.; Carroll, Felix P.; Mascioli, Rocco L.; and Panchak, John R., to Air Products and Chemicals, Inc. Quaternary hydroxyalkyl tertiary amine bases as polyurethane catalysts. 4,116,879, Cl. 252-426.000.
Beck, Charles R. Educational teaching device. 4,115,930, Cl. 35-7.00R.
Beck, Franz, to Hilti Aktiengesellschaft. Method of and assembly for fastening objects on a support material. 4,115,912, Cl. 29-432.000.
Beck, Jacob Howard, to BTU Engineering Corporation. Multiple beam furnace. 4,116,619, Cl. 432-3.000.
Beck, Timothy A. Solar powered biological fuel cell. 4,117,202, Cl. 429-2.000.
Becke, Hans Werner: *See—*
Kalfus, Martin Aaron; and Becke, Hans Werner, 4,117,350, Cl. 307-252.00C.
Becker, Albert. Method and apparatus for practicing golf ball chipping and putting shots. 4,116,447, Cl. 273-183.00B.
Becker, Joseph J.; Luborsky, Fred E.; Jacobs, Israel S.; and McCary, Richard O., to General Electric Company. Treatment of amorphous magnetic alloys to produce a wide range of magnetic properties. 4,116,728, Cl. 148-108.000.
Becker, Joseph T.; and Doran, Byron L. Apparatus for supplying fluids to potted plants. 4,115,951, Cl. 47-81.000.
Becker, Otto Alfred. Process and apparatus for welding sheet metal coated with layers. 4,117,296, Cl. 219-91.210.
Beckman Instruments, Inc.: *See—*
Blanke, John David, 4,116,053, Cl. 73-117.300.
Lillig, John E.; Meyer, Richard C.; and Anderson, Robert J., 4,117,414, Cl. 330-149.000.
Polito, Carole A., 4,116,773, Cl. 195-99.000.
Soref, Richard A., 4,116,544, Cl. 350-336.000.
Becton, Dickinson and Company: *See—*
Dudley, Betty J.; and Williams, Joel L., 4,116,898, Cl. 260-17.40R.
Megahed, Shenoda S., 4,116,068, Cl. 73-425.40P.
Mehl, Jack J.; and Nugent, Edward L., 4,116,066, Cl. 73-421.00R.
Beffa, Fabio; Back, Gerhard; and Steiner, Eginhard, to Ciba-Geigy Corporation. Unsymmetrical azo - azo methine 1:2 chromium complex dyes. 4,116,952, Cl. 260-145.00B.
Beffa, Fabio: *See—*
Bitterlin, Otto; and Beffa, Fabio, 4,116,624, Cl. 8-42.00B.
Behr, Friedrich: *See—*
Schulten, Rudolf; and Behr, Friedrich, 4,117,102, Cl. 423-579.000.
Behr, Karl-Gunter; and Knapp, Helmut, to Minox GmbH. Camera having a telescoping housing. 4,117,513, Cl. 354-187.000.
Behrens, Rudolf Adolf, to American Cyanamid Company. Stabilized accelerator composition for rubber. 4,116,855, Cl. 252-182.000.
Behrenz, Wolfgang: *See—*
Stetter, Jorg; Hammann, Ingeborg; Homeyer, Bernhard; and Behrenz, Wolfgang, 4,117,154, Cl. 424-298.000.
Belanger, William J., to Celanese Polymer Specialties Company. Cathodic electrocoating resin system from polyepoxide, polyamine, and monoepoxide. 4,116,900, Cl. 260-18.0EP.
Belart, Juan, to ITT Industries, Inc. Device for hydraulic braking system incorporating antiskid control apparatus. 4,116,495, Cl. 303-115.000.
Bell, Donald Atkinson; Chorley, Bernard John; Parks, John Ronald; and Wanek, Robert Lewis, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the. Automatic inspection of machined parts. 4,117,539, Cl. 364-551.000.
Bell & Howell Company: *See—*
Kim, Raymond W. H.; and Prelletz, Edward R., 4,116,550, Cl. 352-124.000.
Kim, Raymond W. H.; Lueders, Arthur L.; Prelletz, Edward R.; and Warden, Gerald D., 4,116,551, Cl. 352-124.000.
Whittle, William C.; and Zneimer, Joel E., 4,117,522, Cl. 360-109.000.
Bell, Lon E., to Technar Incorporated. Inertial sensors. 4,116,132, Cl. 102-200.000.
Bell, Richard L.; Josephs, Patricia A.; and Chidsey, Francis A., Jr., to Container Corporation of America. Carton with reclosable inspection flap. 4,116,378, Cl. 229-87.00F.
Bell Telephone Laboratories, Incorporated: *See—*
Ault, Cyrus Frank, 4,117,544, Cl. 365-28.000.
Cannon, Thomas Burt; Metz, Robert Forcier; and Simon, James Louis, 4,117,274, Cl. 179-99.000.
Coldren, Larry Allen; Glass, Alastair Malcolm; and Lemons, Ross Alan, 4,117,424, Cl. 333-30.00R.
DeNigris, Ernest Gerard; Girardi, Joseph; and Ruehl, William Edwin, 4,116,524, Cl. 339-113.00R.
Ehrlich, Marilyn Carol; and Schafersman, Roy Leonard, 4,117,278, Cl. 179-175.20C.
Hubbard, William Marshall; and Muska, Willis Martin, 4,116,532, Cl. 350-96.210.
Yeh, Kou-Min, 4,117,263, Cl. 179-1.0SM.
Bellavance, David W.; and Campbell, Joe C., to Texas Instruments Incorporated. Optical waveguides grown by selective liquid phase epitaxy. 4,116,530, Cl. 350-96.120.
Bellows, Richard James, to Exxon Research & Engineering Co. Removal of a gas component present in a gaseous stream. 4,117,079, Cl. 423-223.000.
Belmuth, Harold M.; Leto, Alfred R.; London, Lawrence; and Zuckerman, Herman A., to Saugatuck Industries, Incorporated. Variable picture frame assembly. 4,115,938, Cl. 40-152.000.
Belousov, Viktor Vasilievich; Glazer, Vadim Moiseevich; and Shestakov, Sergei Vasilievich. Plant for continuous cultivation of microorganisms. 4,116,778, Cl. 195-139.000.
Beltx Corporation: *See—*
DeWoskin, Kenneth J., 4,117,180, Cl. 428-35.000.
Beltz, Klaus; and Frankenfeld, Klaus, to Chemishe Fabrik Budenheim. Process for separating a phosphoric acid-solvent solution. 4,117,092, Cl. 423-321.00S.
Belyakov, Viktor Petrovich: *See—*
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.
Belyavsky, Mikhail Anatolievich: *See—*
Lezgintsev, Georgy Mikhailovich; Istoshin, Stanislav Jurievich; Belyavsky, Mikhail Anatolievich; Kontar, Evgeny Alexeevich; Koptyazhin, Nikolai Nikolaevich; Agaltsov, Georgy Ivanovich; Chernov, Boris Serafimovich; Ter-Saakov, Eduard Isaakovich; and Shkatov, Evgeny Petrovich, 4,116,069, Cl. 73-425.200.
Ben-Amotz, Ami: *See—*
Avron, Mordhay; and Ben-Amotz, Ami, 4,115,949, Cl. 47-1.400.
Bender, Steven Frank, to Motorola, Inc. Phase locked loop signal demodulator and squelch circuit. 4,117,410, Cl. 329-50.000.
Bendig, Larry L.; Siemsen, Cathy S.; and Stowell, Donald E., to Continental Oil Company. Method for the formation of alumina spheres. 4,116,882, Cl. 252-448.000.
Bendig, Larry L.; and Scamehorn, John F., to Continental Oil Company. Method for producing bayerite. 4,117,106, Cl. 423-630.000.
Bendix Corporation, The: *See—*
Cohen, Richard L.; and Anderson, Richard J., 4,117,386, Cl. 318-664.000.
Mayer, Endre A.; and Kelso, Charles R., 4,116,185, Cl. 123-139.0AW.
Bennett, Foster C., to Rheocast Corporation. Apparatus and method to form metal containing nondendritic primary solids. 4,116,423, Cl. 266-200.000.
Benoit, George J.: *See—*
Abbott, Andrew Doyle; and Benoit, George J., 4,116,871, Cl. 252-32.70E.
Berens, Heinrich, to P.I.V. Antrieb Werner Reimers Kommanditgesellschaft. Cone pulley arrangement. 4,116,080, Cl. 74-230.17A.
Berg, David A., to Allis-Chalmers Corporation. Reversible sway limiting blocks for a tractor hitch. 4,116,458, Cl. 280-474.000.
Berges, David Alan, to SmithKline Corporation. 7-Acylamino-3-[1-(2-sulfamidoethyl)tetrazol-5-ylthiomethyl]-3-cephem-4-carboxylic acids. 4,117,123, Cl. 424-246.000.
Berges, David Alan, to SmithKline Corporation. 7-Acylamino-3-[[3-(carboxymethyl)thio-1H-1,2,4-triazol-5-yl]thiomethyl]-3-cephem-4-carboxylic acids. 4,117,124, Cl. 424-246.000.
Berges, David Alan, to SmithKline Corporation. 7-Acylamino-3-[1-[2-(carboxymethylamino]ethyl) tetrazol-5-ylthiomethyl]-3-cephem-4-carboxylic acids. 4,117,125, Cl. 424-246.000.
Berkey, Edgar; Reed, William H., III; and Hickam, William M., to

Westinghouse Electric Corp. Sensor for thermally ionizable particles and/or vapors. 4,117,396, Cl. 324-33.000.

Berliner, Gustave. Table tennis robot. 4,116,438, Cl. 273-30.000.

Bermingham, Winifred. Disposable female-body-worn urinal. 4,116,197, Cl. 128-286.000.

Bernstein, Morton J. Sit-up exercise apparatus. 4,116,434, Cl. 272-93.000.

Bernstein, Seymour: *See*—
Conrow, Ransom Brown; and Bernstein, Seymour, 4,117,003, Cl. 260-510.000.

Bertalan, Gyorgy: *See*—
Huszar, Andor; Szekely, Geza; Rusznak, Istan; Trezl, Lajos; Bertalan, Gyorgy; Zaoui nee Serfozo, Ilona; and Molnar, Imre, 4,116,897, Cl. 260-17.40R.

Bertea Corporation: *See*—
Cass, Ronald F., 4,116,504, Cl. 308-72.000.

Bertelson, Alexander Bruno, to Savage Technical Services, Inc. Pollution control system. 4,116,835, Cl. 210-100.000.

Berthiaume, Camille, to Columbia Chase Corporation. Combustion process. 4,116,610, Cl. 431-4.000.

Berthou, Knud Vilhelm. Apparatus for shaping sheet material. 4,116,038, Cl. 72-413.000.

Berton, Yves; and Chauvet, Pierre, to Commissariat a l'Energie Atomique. Method of decontamination of radioactive effluents. 4,116,863, Cl. 252-301.10W.

Bertsch, Lyle E. Method of erecting swimming pool structure. 4,115,977, Cl. 52-742.000.

Bessonov, Andrei Stefanovich; Uspensky, Alexandr Vitalievich; and Shekhovtsov, Nikolai Vasilievich. Apparatus for isolation of trichinella larvae. 4,116,636, Cl. 422-101.000.

Beuchat, Roger, to Mefina S.A. Electronic firing device for missiles. 4,116,133, Cl. 102-215.000.

BHS-Bayerische Berg-, Hutten- und Salzwerke Aktiengesellschaft: *See*—
Mosburger, Hans; and Reis, Christoph, 4,116,399, Cl. 242-58.400.

Biax-Fiberfilm Corporation: *See*—
Schwarz, Eckhard C. A., 4,116,892, Cl. 521-62.000.

Bible, Harley V.; Goff, Clifford E.; and Moon, William T., Jr., to Robertshaw Controls Company. Indicator flag construction. 4,116,155, Cl. 116-65.000.

BICC Limited: *See*—
Swarbrick, Peter; Green, William John; and Maillefer, Charles, 4,117,195, Cl. 428-379.000.

Bieniok, Joachim; and Crouzet, Henri, to Heberlein & Co. AG; and Ateliers Roannais de Constructions Textiles. Twist tube for false-twist devices. 4,115,986, Cl. 57-77.300.

Biermacher John J., to Upjohn Company, The. High pressure liquid chromatography apparatus. 4,116,837, Cl. 210-198.00C.

Bigelow, John Howard, to Du Pont de Nemours, E. I., and Company. Sulfur-substituted isothioureas in silver halide emulsions. 4,116,697, Cl. 96-95.000.

Bigfoot Industries, Inc.: *See*—
Darrell, Robert William, 4,116,450, Cl. 273-249.000.

Bijma, Jan, to U.S. Philips Corporation. Method of adjusting a magnetic deflection unit of a cathode ray tube, cathode ray tube having a deflection unit or reference points adjusted according to said method, and a deflection unit provided with reference points adjusted according to said method. 4,117,379, Cl. 315-370.000.

Bikbau, Marsel Yanovich: *See*—
Oborin, Pavel Alexandrovich; Gadaev, Anatoly Yakovlevich; Bikbau, Marsel Yanovich; Nudelman, Boris Izrailovich; Aronova, Irina Zelmanovna; Bulatov, Nail Yakubovich; and Sosenko, Lev Matveevich, 4,116,707, Cl. 106-104.000.

Binder, Peter: *See*—
Gross, Friedrich; Binder, Peter; and Brehmer, Dieter, 4,116,115, Cl. 92-168.000.

Binks Manufacturing Company: *See*—
Culbertson, Samuel W.; and Polstra, James W., 4,116,364, Cl. 222-40.000.

Binns, Robert Eric, to Amchem Products, Inc. Composition for cleaning aluminum at low temperatures. 4,116,853, Cl. 252-142.000.

Birch, Norman. Emergency breathing apparatus. 4,116,237, Cl. 128-142.700.

Bishop, Arthur Ernest. Rack and pinion steering gear. 4,116,085, Cl. 74-422.000.

Bishop, Robert L., to West County Supply & Mfg. Co., Inc. Vent cover. 4,115,961, Cl. 52-58.000.

Bistline, Raymond G., Jr.; Linfield, Warner M.; and Noble, Wilfred R., to United States of America, Agriculture. Process for sulfating fatty alkanolamides. 4,116,986, Cl. 260-401.000.

Bitney, Ronald G.: *See*—
Garofano, Norman R.; and Bitney, Ronald G., 4,116,757, Cl. 159-47.0WL.

Bitterlin, Otto; and Beffa, Fabio, to Ciba-Geigy Corporation. New heavy metal complex dyes, process for their manufacture and use thereof. 4,116,624, Cl. 8-42.00B.

Bjorhn, Gunnar. Ball-collecting apparatus. 4,116,436, Cl. 273-29.00R.

Blackburne, Owen Rodney: *See*—
Shapiro, Warren B.; and Blackburne, Owen Rodney, 4,117,107, Cl. 424-54.000.
Shapiro, Warren B.; and Blackburne, Owen Rodney, 4,117,108, Cl. 424-54.000.

Bland, Walter P.: *See*—
McKendry, Lennon H.; and Bland, Walter P., 4,116,672, Cl. 71-91.000.

Blanke, John David, to Beckman Instruments, Inc. Thermal reactor/-catalytic converter efficiency determination method. 4,116,053, Cl. 73-117.300.

Blessent, John B. Agricultural tillage equipment. 4,116,283, Cl. 172-443.000.

Bletz, Walter: *See*—
Holle, Werner; and Bletz, Walter, 4,117,325, Cl. 250-209.000.

Blevins, Gerald Glen; Dumar, William Lewis, Jr.; Hansen, Steven Royal; Hixson, Wayne Ellory; and Krezak, John Edward, to Boeing Company, The. Insulating stand-off and method of assembling same. 4,117,261, Cl. 174-164.000.

Bliss & Laughlin Industries, Inc.: *See*—
Johnson, Eugene R.; and Mower, Morris F., 4,116,604, Cl. 425-458.000.

Bliss, Robert L., to University of Utah. Foldable/extensible structure. 4,115,975, Cl. 52-646.000.

Blocher, John M., Jr.; and Browning, Melvin F., to Texas Instruments Incorporated. Process for silicon and trichlorosilane production. 4,117,094, Cl. 423-342.000.

Blokhina, Valentina Alexeevna: *See*—
Tikhova, Nina Mikhailovna; Blokhina, Valentina Alexeevna; Antipova, Antonina Petrovna; and Vasilieva, Tamara Pavlovna, 4,116,731, Cl. 148-161.000.

Bluestein, Ben Alfred; and Evans, E. Robert, to General Electric Company. Process for producing aromatic-containing silicone compounds. 4,116,993, Cl. 260-448.20E.

Blytas, George C., to Shell Oil Company. Process for demetallizing of heavy hydrocarbons. 4,116,820, Cl. 208-251.00R.

Boario, William R., to United States of America, Air Force. Real time signal correlator for high resolution radar. 4,117,480, Cl. 343-5.0CM.

Bochkarev, Ellin Petrovich: *See*—
Maslov, Vadim Nikolaevich; Korobov, Oleg Evgenievich; Lupacheva, Alla Naumovna; Vlasov, Alexandr Nikolaevich; Myasoedov, Viktor Vasilievich; Bochkarev, Ellin Petrovich; Gimelfarb, Felix Aronovich; Bronshtein, Izidor Karlovich; Lukicheva, Natalya Ivanovna; Sinitsyn, Evgeny Vladimirovich; Sokurenko, Jury Varnavovich; Jurova, Elena Sergeevna; Kistova, Elena Mikhailovna; Konstantinova, Marina Andreevna; and Samaginov, Veniamin Mikhailovich, 4,117,504, Cl. 357-16.000.

Bodner, Ronald Eugene, to International Business Machines Corporation. Instruction processing control apparatus. 4,117,536, Cl. 364-200.000.

Bodor, Nicolae S.; and Sloan, Kenneth B., to INTERx Research Corporation. Transient pro-drug forms of phenylbutazone. 4,117,232, Cl. 548-365.000.

Bodson, Luc: *See*—
Obsomer, Marc; Bodson, Luc; and Michel, Edmond, 4,116,609, Cl. 425-526.000.

Boeing Company, The: *See*—
Blevins, Gerald Glen; Dumar, William Lewis, Jr.; Hansen, Steven Royal; Hixson, Wayne Ellory; and Krezak, John Edward, 4,117,261, Cl. 174-164.000.
Hansen, Karl A.; and Hendrickson, I. Glen, 4,116,031, Cl. 72-56.000.

Boerstler, Leslie H.; Discenza, Walter V., Jr.; Marvin, Mason D.; and Ebersole, Theodore J., to General Electric Company. Control system for a Rankine cycle power unit. 4,117,344, Cl. 290-52.000.

Bogaard, Hendricus Johannes Maria, to Stork Amsterdam B.V. Installation for thermal treatment of container-packed commodities. 4,116,117, Cl. 99-361.000.

Boger, Allen D., Jr.: *See*—
Hudspeth, Emmett L.; Richardson, Philip C.; Neathery, John L., Jr.; Dykstra, Jerald P.; Boger, Allen D., Jr.; Sims, William B., Jr.; Hunt, Glenn E.; and Quisenberry, Tony M., 4,116,228, Cl. 128-2.00R.

Boggs, Alben C.; and Stover, John C., to Emerson Electric Co. Explosion-proof electric air heater. 4,117,308, Cl. 219-365.000.

Boggs, Roger L.: *See*—
Schimpf, James E.; Boggs, Roger L.; and Kinsinger, Malcolm H., 4,116,497, Cl. 305-41.000.

Boileau, Sylvia: *See*—
Lehn, Jean-Marie; Schue, Francois; Boileau, Sylvia; Kaempf, Bernd; Cau, Alain Andre; Moinard, Jean Robert; and Raynal, Serge Fernand, 4,116,887, Cl. 260-2.00A.

Bolie, Victor W. Severe climate windmill. 4,116,581, Cl. 415-2.000.

Bolin, Philip C., to Westinghouse Electric Corp. Gas-insulated transmission lines with DC voltage limiting means. 4,117,528, Cl. 361-120.000.

Bolling, Donald Louis: *See*—
Power, George Edward; and Bolling, Donald Louis, 4,117,198, Cl. 428-452.000.

Bolt Beranek and Newman Inc.: *See*—
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Bolyky, Janos: *See*—
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Bombardier Limited: *See*—
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Bombardieri, Caurino Cesar: *See*—
Butler, Roger Moore; Bombardieri, Caurino Cesar; and Slevinsky, Bruce Alexander, 4,116,275, Cl. 166-303.000.

Bon, Charles K., to Dow Chemical Company, The. Corrosion prevention system. 4,116,782, Cl. 204-147.000.

Bonati, Attilio; and Gabetta, Bruno, to Inverni Della Beffa S.p.A. Vasodilating cuanzine hydrazides. 4,117,133, Cl. 424-256.000.

Bones, Roger John: *See—*
Markin, Trevor Leslie; Bones, Roger John; Scott, Keith Taylor; May, Geoffrey John; and Robinson, Graham, 4,117,209, Cl. 429-104.000.

Bonkowski, Teofil L.: *See—*
Curry, Byron V., and Bonkowski, Teofil L., 4,116,331, Cl. 206-150.000.

Bonnemay, Alain, to Commissariat a l'Energie Atomique. Computing module. 4,117,540, Cl. 364-602.000.

Books, William R.; and Heinzel, Irving C., to Brooks, William R. Purgeable dispensing gun for polyurethane foam and the like. 4,117,551, Cl. 366-162.000.

Booth, Frederick C. Electrically operated seatbelt retractor. 4,116,295, Cl. 180-82.00C.

Borg-Warner Corporation: *See—*
Kelbel, Donald William, 4,116,082, Cl. 74-360.000.
Miller, Alan Leonard, 4,116,321, Cl. 192-103.00F.
Muench, Paul William, 4,117,537, Cl. 364-492.000.
Steffancin, William, 4,117,034, Cl. 260-873.000.
York, James F., 4,116,926, Cl. 260-45.70P.

Borner, Hans G. K., to Gerlach-Werke GmbH. Track construction for tracked land vehicles such as tanks. 4,116,498, Cl. 305-58.00R.

Borsanyi, Alexander S., to American Hospital Supply Corporation. Semipermeable membrane mass transfer apparatus having collapsed membrane about support members. 4,116,841, Cl. 210-321.00B.

Bosch-Siemens Hausgerate GmbH: *See—*
Mayer, Rolf, 4,116,099, Cl. 83-571.000.

Bouchard, Andre C.: *See—*
Hall, Harold H., Jr.; and Bouchard, Andre C., 4,116,615, Cl. 431-92.000.
Hall, Harold H., Jr.; and Bouchard, Andre C., 4,116,616, Cl. 431-93.000.

Bourns, Inc.: *See—*
Hildreth, Bradrick Alan; and Stephens, Donald Harrison, 4,117,444, Cl. 338-198.000.

Bousquet, Gilles: *See—*
Rambert, Andre; Bousquet, Gilles; and Dejour, Henri, 4,115,875, Cl. 3-1.913.

Bovier, Edward M.: *See—*
Musselman, Camillus B.; and Bovier, Edward M., 4,116,740, Cl. 156-205.000.

Bowen, Alan W.: *See—*
Love, Robert Bruce; and Bowen, Alan W., 4,116,806, Cl. 204-298.000.

Boy Marcotte, Jean-Louis; Chevalier, Georges; Gerij, Janusz; and Leheu, Jacques, to Commissariat a l'Energie Atomique. Liquid metal cooled nuclear reactor. 4,116,765, Cl. 176-38.000.

Boyd, David C.; Flannery, James E.; Morgan, David W.; Rosplock, Sara E.; and Sczerbaniewicz, Stella A., to Corning Glass Works. Colored glassware. 4,116,704, Cl. 106-54.000.

Boyd, John H., Jr.; and Nelson, Don C., Jr., to General Electric Company. Adaptable resilient motor mounting. 4,116,410, Cl. 248-26.000.

Bracher, Douglas Lee: *See—*
Joshi, Satish Vishwanath; and Bracher, Douglas Lee, 4,116,690, Cl. 75-257.000.

Brachman, Armand E.; Khattab, Ghazi; and Smolin, Edwin M., to GAF Corporation. Poly(tetramethylene terephthalate)-polyether block. 4,116,925, Cl. 260-42.180.

Bradshaw, Cyril E., to Eaton Corporation. Variable percentage exhaust gas recirculation valve. 4,116,182, Cl. 123-119.00A.

Bradshaw, Noel James; Savage, David; and Sneath, Michael Edwin, to Lever Brothers Company. Process for preparing simulated soft centered fruits. 4,117,172, Cl. 426-276.000.

Brame, Thomas Vinton: *See—*
Fabry, Lloyd W.; and Brame, Thomas Vinton, 4,117,454, Cl. 340-81.00F.

Brami, Gilbert: *See—*
Lavalley, Roger; Gozlan, Roger; and Brami, Gilbert, 4,117,450, Cl. 340-52.00H.

Brandt Company, The: *See—*
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Brandt-Pra, Inc.: *See—*
McInerny, George P., 4,116,127, Cl. 101-232.000.

Brannigan, Lawrence H.; Franz, John E.; and Howe, Robert K., to Monsanto Company. 1-Alkyl-3-aryl-4-pyrazolecarboxylates. 4,116,673, Cl. 71-92.000.

Brassel, Leo, to Schmelzbasaltwerk Kalenborn, Dr. Ing. Mauritz KG. Feeding chute or gate. 4,116,621, Cl. 432-233.000.

Bratschi, Konrad. Strip curtain. 4,116,257, Cl. 160-168.00R.

Braun, Fritz: *See—*
Hell, August; Kobusch, Wolfram; and Braun, Fritz, 4,115,981, Cl. 53-55.000.

Braun, Karl; Lacher, Rainer; and Pfeiffer, Willi, to Aesculap-Werke Aktiengesellschaft vormals Jetter & Scheerer. Milling tool for surgical purposes. 4,116,200, Cl. 128-305.000.

Bray, Andrew M.: *See—*
Leanna, Dale D.; Jorgensen, Allen R.; Curro, Thomas R.; and Bray, Andrew M., 4,116,594, Cl. 425-3.000.

Bredeweg, Robert A.; and Dhingra, Yog R., to Dow Chemical Company, The. Eradication of bis-chloromethyl ether and 1,1,1,2-tetrachloroethane from chloroacetyl chloride. 4,117,007, Cl. 260-544.00Y.

Brehmer, Dieter: *See—*
Gross, Friedrich; Binder, Peter; and Brehmer, Dieter, 4,116,115, Cl. 92-168.000.

Brennan, Michael E., to Texaco Development Corp. Production of N-(substituted) morpholine. 4,117,227, Cl. 544-170.000.

Brenner, L. Martin, to SmithKline Corporation. Sulfonyl benzofurans and benzothiophenes having coronary vasodilator activity. 4,117,128, Cl. 424-248.500.

Breslow, Jeffrey D., to Marvin Glass & Associates. Amusement device. 4,116,449, Cl. 273-240.000.

Bridges, Charles D.: *See—*
McGee, John K.; and Bridges, Charles D., 4,116,277, Cl. 166-315.000.

Bridgestone Tire Company Limited: *See—*
Hayakawa, Hiroshi; and Ezura, Sakae, 4,116,255, Cl. 152-352.00R.
Honda, Toshio; Tanuma, Itsuo; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; and Suzuki, Yoshikatsu, 4,117,036, Cl. 260-878.00R.

Brien, Andre Guy. Automatic wristwatch construction. 4,115,995, Cl. 58-50.00R.

Bristol Products, Inc.: *See—*
Colten, Jerrold L., 4,117,305, Cl. 219-213.000.

Broerse, Pieter Hendrik: *See—*
Van Vliet, Johannes Adrianus Josephus Maria; and Broerse, Pieter Hendrik, 4,117,371, Cl. 315-46.000.

Brois, Stanley J.; Gutierrez, Antonio; and Winans, Esther D., to Exxon Research & Engineering Co. Borated oxazolines as varnish inhibiting dispersants in lubricating oils. 4,116,876, Cl. 252-49.600.

Brois, Stanley J.: *See—*
Ryer, Jack; Brois, Stanley J.; and Winans, Esther D., 4,116,643, Cl. 44-63.000.

Bronshtein, Izidor Karlovich: *See—*
Maslov, Vadim Nikolaevich; Korobov, Oleg Evgenievich; Lupacheva, Alla Naumovna; Vlasov, Alexandr Nikolaevich; Myasoedov, Viktor Vasilievich; Bochkarev, Ellin Petrovich; Gimelfarb, Felix Aronovich; Bronshtein, Izidor Karlovich; Lukicheva, Natalya Ivanovna; Sinitsyn, Evgeny Vladimirovich; Sokurenko, Jury Varnavovich; Jurova, Elena Sergeevna; Kistova, Elena Mikhailovna; Konstantinova, Marina Andreevna; and Samaginov, Veniamin Mikhailovich, 4,117,504, Cl. 357-16.000.

Brooks, William R.: *See—*
Books, William R.; and Heinzel, Irving C., 4,117,551, Cl. 366-162.000.

Brosenius, Karl Hilding, to Tekram Associates. Self sealing heat insulating shutter system. 4,115,953, Cl. 49-125.000.

Brother Kogyo Kabushiki Kaisha: *See—*
Hishida, Yukio; Asai, Yuichi; Kondo, Toshikatsu; Asai, Akira; Sakaida, Atsuo; and Miyazawa, Chiaki, 4,117,435, Cl. 335-270.000.

Brown Boveri-Sulzer Turbomaschinen AG.: *See—*
Hoffeins, Hans, 4,117,343, Cl. 290-52.000.

Brown, Edward Morris: *See—*
Towns, Edward Johnson; and Brown, Edward Morris, 4,116,371, Cl. 222-455.000.

Brown, Richard E., to Warner-Lambert Company. Indolobenzoxazepines as CNS depressants. 4,117,129, Cl. 424-248.570.

Brown, Richard E.; Puchalski, Chester; and Shavel, John, Jr. Bronchodilating piperidinoethyl benzopyranopyridinones. 4,117,140, Cl. 424-267.000.

Browning, Melvin F.: *See—*
Blocher, John M., Jr.; and Browning, Melvin F., 4,117,094, Cl. 423-342.000.

Brucat, John N.: *See—*
Taylor, Stanford Earl; and Brucat, John N., 4,116,547, Cl. 351-31.000.

Bruinink, Jacob: *See—*
Ponjee, Johannes Jacobus; and Bruinink, Jacob, 4,116,535, Cl. 350-355.000.

Brungart, Nelson D. Integrated steering control for tracked vehicles. 4,116,291, Cl. 180-6.200.

Brunner, Friedrich Christian; Schwerdt, Friedrich Wilhelm; and Steinbeck, Hans-Heinz, to International Business Machines Corporation. Method of making an amorphous silicon dioxide free of metal ions. 4,117,093, Cl. 423-339.000.

Bryan, William Thomas: *See—*
Temple, Robert Dwight; Bryan, William Thomas; and Willig, Carl Joseph, 4,116,854, Cl. 252-167.000.

Brymill Corporation: *See—*
Bryne, Michael D., 4,116,199, Cl. 128-303.100.

Bryne, Michael D., to Brymill Corporation. Cryosurgical instrument reservoir. 4,116,199, Cl. 128-303.100.

Bryngelson, James R. Two position spare wheel mount for the sidewall of a pickup truck. 4,116,373, Cl. 224-42.210.

BTU Engineering Corporation: *See—*
Beck, Jacob Howard, 4,116,619, Cl. 432-3.000.

Buchberger, Gerhard: *See—*
Holst, Arno; Kostrzewa, Michael; and Buchberger, Gerhard, 4,117,222, Cl. 536-50.000.

Buchel, Karl Heinz; Regel, Erik; and Plempel, Manfred, to Bayer Aktiengesellschaft. Disubstituted triphenylmethylmidazoles for treating mycotic infections. 4,117,142, Cl. 424-273.00R.

Bucher, Robert, to Sulzer Brothers Limited. Jacquard machine having means for controlling jacquard needle motion. 4,116,242, Cl. 139-59.000.

Buchholz, Peter: *See—*
Kramer, Peter; and Buchholz, Peter, 4,116,483, Cl. 296-28.00C.

Buck, Robert. Electronic monitoring system with low energy consumption in quiescent state. 4,117,393, Cl. 323-25.000.

Buck, Robert T.: *See—*
Adrion, Robert F.; Buck, Robert T.; and Eppes, William R., 4,117,338, Cl. 250-461.00R.

Buczek, Carl James: *See—*
Martin, Anthony Newman; Buczek, Carl James; and Mongeon, Robert Joseph, 4,116,000, Cl. 60-242.000.

Budnick, Edward G., to Plains Chemical Development Co. Chelation. 4,116,990, Cl. 260-429.00J.

Budris, Allan R., to Worthington Pump, Inc. Multi-purpose end casings for ring type multi-stage centrifugal pumps. 4,116,583, Cl. 415-199.100.

Buehler, John D.; Shah, Pravinchandra B.; and Joslin, Robert S., to William H. Rorer, Inc. Method for lowering the viscosity of certain agents. 4,117,116, Cl. 424-157.000.

Buel, G. Theodore. Heel binding for trail skis. 4,116,462, Cl. 280-614.000.

Buiocchi, Charles Joseph: *See—*
Olsen, Gregory Hammond; Zamerowski, Thomas Joseph; and Buiocchi, Charles Joseph, 4,116,733, Cl. 148-175.000.

Bulatov, Nail Yakubovich: *See—*
Oborin, Pavel Alexandrovich; Gadaev, Anatoly Yakovlevich; Bikbau, Marsel Yanovich; Nudelman, Boris Izrailovich; Aronova, Irina Zelmanovna; Bulatov, Nail Yakubovich; and Sosenko, Lev Matveevich, 4,116,707, Cl. 106-104.000.

Bulychev, Gennady Alexeevich; Bykovsky, Anatoly Vladimirovich; Machigin, Stanislav Pavlovich; and Strelkov, Konstantin Sergeevich. Device for suspension of aircraft model in wind tunnel. 4,116,056, Cl. 73-147.000.

Burd, David Miller. Solar energy collector. 4,116,220, Cl. 126-271.000.

Burda, Ferencne: *See—*
Takatsy, Gyula; Barb, Katalin; Muranyi, Istvan; and Burda, Ferencne, 4,116,777, Cl. 195-127.000.

Bureau de Recherches Geologiques et Minieres: *See—*
Dufort, Jacques L.; and Hermelin, Roger R., 4,116,749, Cl. 156-555.000.

Burgbacher, Martin, to Papst Motoren KG. Drive arrangement for yarn storage and dispensing units. 4,116,397, Cl. 242-47.010.

Burger, Jacobus J.: *See—*
Radstake, Herman; Hasenack, Nicolas A.; Van Latenstein, Anthonie; and Burger, Jacobus J., 4,116,681, Cl. 75-41.000.

Burgess, Eldon W. Thermal power sustaining switch. 4,117,346, Cl. 307-117.000.

Burghard, Clement E.; and Coletti, Veronica L., to Grumman Aerospace Corporation. High speed double error correction plus triple error detection system. 4,117,458, Cl. 340-146.1AL.

Burgoon, Jack L., to Scott & Fetzer Company, The. High-speed polishing machine. 4,115,890, Cl. 15-49.00R.

Burks, Lucile. Drinking doll having wetting and non-wetting modes. 4,115,948, Cl. 46-141.000.

Burlington Industries, Inc.: *See—*
Davis, Delbert A., 4,116,743, Cl. 156-333.000.

Burmeister, Karl-Heinz, to Ipsen Industries International Gesellschaft mit beschrankter Haftung. Loading device. 4,116,324, Cl. 198-472.000.

Burrell, John R. Apparatus for producing retreading envelopes. 4,116,605, Cl. 425-466.000.

Burroughs Corporation: *See—*
Sims, Dewey M., Jr., 4,117,430, Cl. 335-205.000.
Vinson, Mark Alexander, 4,116,720, Cl. 148-1.500.
Wolfe, John Edmond, 4,117,339, Cl. 250-492.00A.

Burroughs Wellcome Co.: *See—*
Stuart, Alexander; and Paterson, Thomas, 4,116,958, Cl. 544-325.000.

Burry, Devitt S.: *See—*
Smiggen, Frank J.; Burry, Devitt S.; Kallaby, Joseph; and Goltz, Wayne H., 4,116,715, Cl. 134-6.000.

Burton, Gardner Thomas: *See—*
Clay, Burton Ross; and Burton, Gardner Thomas, 4,116,526, Cl. 350-3.670.

Busch, Charles R., to Aktiebolaget Electrolux. Multi-layer filter dust bag for a vacuum cleaner. 4,116,648, Cl. 55-276.000.

Bush, Richard Wayne: *See—*
Morgan, Charles Robert; and Bush, Richard Wayne, 4,117,017, Cl. 260-609.00R.

Butler, Roger Moore; Bombardieri, Caurino Cesar; and Slevinsky, Bruce Alexander, to Exxon Production Research Company. Recovery of hydrocarbons by in situ thermal extraction. 4,116,275, Cl. 166-303.000.

Butler, Walter J.; and Eichelberger, Charles W., to General Electric Company. Controlled current sink. 4,117,353, Cl. 307-297.000.

Butterworth, Donald James, to Ecodyne Corporation. Liquid treatment apparatus. 4,116,840, Cl. 210-279.000.

Buysch, Hans-Josef; Oertel, Harald; and Roos, Ernst, to Bayer Aktiengesellschaft. Synthetic polymer compositions stabilized against discoloration and degradation. 4,116,932, Cl. 260-45.95R.

Byers, Thomas L. Color separated film strip type font. 4,116,694, Cl. 96-41.000.

Bykasov, Viktor Ivanovich: *See—*
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.

Bykovsky, Anatoly Vladimirovich: *See—*
Bulychev, Gennady Alexeevich; Bykovsky, Anatoly Vladimirovich; Machigin, Stanislav Pavlovich; and Strelkov, Konstantin Sergeevich, 4,116,056, Cl. 73-147.000.

Byrne, Robert: *See—*
Jaekle, William M.; Byrne, Robert; and Giovanelli, Armand, 4,116,135, Cl. 105-378.000.

Byrum, Bernard W., Jr., to Owens-Illinois, Inc. Method of making gas discharge display device with protective dielectric. 4,116,792, Cl. 204-192.00E.

C.F.F. Inc.: *See—*
Chavarria, Robert James; and Foster, Clark Berg, 4,116,439, Cl. 273-59.00A.

C & S Antennas Limited: *See—*
Hanna, Kheder Abdul Karim; and Collins, Brian Stuart, 4,117,491, Cl. 343-742.000.

Cadillac Products, Inc.: *See—*
Barnett, Karl F., 4,116,116, Cl. 93-35.00R.

Caisley, Ronald. Prefabricated building structure. 4,115,962, Cl. 52-79.400.

Calder, Oliver J., to A.S.M. Company. Spray nozzle head. 4,116,386, Cl. 239-119.000.

Campbell, Donn V.: *See—*
Arnold, James J., deceased; Campbell, Donn V.; DeSantis, Charles M.; and Schwering, Felix, 4,117,490, Cl. 343-708.000.
Arnold, James J., deceased; and Campbell, Donn V., 4,117,492, Cl. 343-747.000.

Campbell, Joe C.: *See—*
Bellavance, David W.; and Campbell, Joe C., 4,116,530, Cl. 350-96.120.

Campbell, Ronald B., Jr.: *See—*
Shrader, William W.; and Campbell, Ronald B., Jr., 4,117,538, Cl. 364-517.000.

Canada-Cities Service, Ltd.: *See—*
Kizior, Thaddeus Eugene, 4,116,809, Cl. 208-11.0LE.

Canada, Her Majesty the Queen in right of, as represented by the Minister of Energy, Mines and Resources: *See—*
Kizior, Thaddeus Eugene, 4,116,809, Cl. 208-11.0LE.

Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
Perrault, Guy; Francoeur, Raynald; and Lavertu, Roger, 4,116,734, Cl. 149-19.200.

Canadian Foremost Ltd.: *See—*
Ewert, Russ J., 4,116,467, Cl. 280-764.000.

Canadian International Paper Co.: *See—*
Ford, Michael J.; and Gardner, Prescott Elliott, 4,116,758, Cl. 162-28.000.

Candela Electronics, Inc.: *See—*
Lesea, Ronald A., 4,117,270, Cl. 179-18.0BE.

Cannon, Thomas Burt; Metz, Robert Forcier; and Simon, James Louis, to Bell Telephone Laboratories, Incorporated. Key telephone privacy circuit. 4,117,274, Cl. 179-99.000.

Canon Kabushiki Kaisha: *See—*
Knechtel, Wilhelm; and Tokiwa, Taisuke, 4,116,561, Cl. 355-57.000.

Capuano, Terry D.: *See—*
Heldmann, Ernest J.; and Capuano, Terry D., 4,116,572, Cl. 403-7.000.

Caramanian, John A. Composition for treating concrete surfaces. 4,116,915, Cl. 260-31.4EP.

Carasso, Marino Giuseppe; van de Polder, Leendert Johan; and Tan, Sing Liong, to U.S. Philips Corporation. Television camera having signal electrode strips. 4,117,515, Cl. 358-217.000.

Carl Schleicher & Schull: *See—*
Hein, Wolfgang; Cosack, Claus; and Grundmann, Peter, 4,116,844, Cl. 210-446.000.

Carlsen, John S.: *See—*
Johnson, Edward F.; and Carlsen, John S., 4,117,027, Cl. 260-824.00R.

Carlson, David Emil; and Wronski, Christopher Roman, to RCA Corporation. Amorphous silicon photovoltaic device having an insulating layer. 4,117,506, Cl. 357-30.000.

Carne, Charles Nicholas: *See—*
Tomlinson, Ernest Valdur; and Carne, Charles Nicholas, 4,117,320, Cl. 250-237.00G.

Carpco, Inc.: *See—*
Webb, Clyde B., 4,116,822, Cl. 209-11.000.

Carrico, Arnold J. Flexible multi-columnar fluid treatment cellular apparatus. 4,117,049, Cl. 261-111.000.

Carrier Corporation: *See—*
Liberman, Harvey W.; Goranson, Paul L.; Ratledge, R. Houston, Jr.; and Salyers, John C., 4,116,121, Cl. 100-39.000.

Carroll, Felix P.: *See—*
Bechara, Ibrahim S.; Carroll, Felix P.; Mascioli, Rocco L.; and Panchak, John R., 4,116,879, Cl. 252-426.000.

Carson (Instruments & Equipment) Limited: *See—*
Tomlinson, Ernest Valdur; and Carne, Charles Nicholas, 4,117,320, Cl. 250-237.00G.

Carson, John C., Jr.: *See—*
Kenkare, Divaker B.; Hall, Robert T., II; and Carson, John C., Jr., 4,116,354, Cl. 220-20.000.

Cases, Moises: *See—*
Anantha, Narasipur Gundappa; Cases, Moises; Chang, Fung Yuel; and Rubin, Barry Jay, 4,117,546, Cl. 365-233.000.

Cass, Ronald F., to Bertea Corporation. Spherical bearing and method of making the same. 4,116,504, Cl. 308-72.000.

Cassano, James R.: *See—*
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,116,431, Cl. 271-236.000.

Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Gattner, Hans; and Ribka, Joachim, 4,116,918, Cl. 260-37.00P.

Cassidy, Patrick E.: *See—*
Johnson, Ben C.; Thornton, J. Scott; Glowe, Donald E.; Cassidy, Patrick E.; and Anderson, Robert E., 4,117,312, Cl. 219-548.000.

Caterpillar Mitsubishi Ltd.: *See—*
Uchida, Tomio, 4,116,346, Cl. 214-145.00A.
Uchida, Tomio, 4,116,347, Cl. 214-145.00A.

Caterpillar Tractor Co.: *See—*
Earle, Michael; and Lenzen, Glenn H., Jr., 4,117,302, Cl. 219-121.0LM.
Liesener, Kenneth P., 4,116,587, Cl. 417-212.000.
Luttrell, Richard W.; and Purcell, Robert J., 4,116,081, Cl. 74-243.00R.
Schimpf, James E.; Boggs, Roger L.; and Kinsinger, Malcolm H., 4,116,497, Cl. 305-41.000.
Staebler, Paul J., 4,116,265, Cl. 165-95.000.
Walden, Gerald M., 4,116,412, Cl. 248-358.00R.

Cau, Alain Andre: *See—*
Lehn, Jean-Marie; Schue, Francois; Boileau, Sylvia; Kaempf, Bernd; Cau, Alain Andre; Moinard, Jean Robert; and Raynal, Serge Fernand, 4,116,887, Cl. 260-2.00A.

CAV Limited: *See—*
Drori, Moshe, 4,116,186, Cl. 123-139.0AM.

CAW Industries, Inc.: *See—*
Willard, John Wesley, Sr., 4,116,666, Cl. 71-77.000.

Cayley, Michael Paul. Electric towel warmer. 4,117,309, Cl. 219-385.000.

Ceiling Resurfacing Systems, Inc.: *See—*
Weinar, Roger Neil, 4,115,970, Cl. 52-311.000.

Celanese Polymer Specialties Company: *See—*
Belanger, William J., 4,116,900, Cl. 260-18.0EP.

Cella, James A., to General Electric Company. Moisture curable epoxy compositions containing dicarbonyl chelates. 4,116,886, Cl. 528-88.000.

Central Glass Company, Limited: *See—*
Fujita, Yoshishige; Asagao, Soichi; and Ogura, Motoshige, 4,117,089, Cl. 423-306.000.
Mukai, Kunihiko; Mishima, Michiharu; Ogino, Kiyoshi; and Iseki, Shuichi, 4,116,656, Cl. 65-5.000.

Central States Tooling Service, Inc.: *See—*
Roberts, Bruce D., 4,116,398, Cl. 242-56.00R.

Cermol S.A.: *See—*
Molnar, Francois; Szabo, Suzanne; and Statkov, Peter Radanow, 4,117,160, Cl. 424-316.000.

Cervantes, Lawrence M. Self-righting roadway marking device. 4,117,455, Cl. 340-114.00R.

Chakrin, Lawrence William; Snader, Kenneth Means; and Willis, Chester Rhodes, to SmithKline Corporation. Substituted 3-cinnamoyl-2H-pyran-2,6(3H)-diones. 4,117,226, Cl. 542-438.000.

Chandler, Edgar Frank: *See—*
Demarest, Donald Monroe; and Chandler, Edgar Frank, 4,117,527, Cl. 361-103.000.

Chang, Fung Yuel: *See—*
Anantha, Narasipur Gundappa; Cases, Moises; Chang, Fung Yuel; and Rubin, Barry Jay, 4,117,546, Cl. 365-233.000.

Channing, Harry M.: *See—*
Windisch, Lawrence; Nees, John; and Channing, Harry M., 4,117,387, Cl. 320-2.000.

Chappell, Christopher Lee, to Stablex AG. Detoxification. 4,116,705, Cl. 106-90.000.

Charles, Joseph T.; and Ryan, James P., to Coil Sales & Manufacturing Company. Diode package for use with a central office connector module. 4,117,264, Cl. 179-1.0PC.

Charles, Ronald A.; Jones, Paul W.; Staples, John L.; and Wiegner, Joseph R., to McDonnell Douglas Corporation. Machine and process for reading cards containing medical specimens. 4,116,775, Cl. 195-103.50M.

Charles Stark Draper Laboratory, Inc., The: *See—*
MacLennan, Alexander G., 4,117,436, Cl. 336-65.000.

Charlesworth, Rita. Phonetics system and method of teaching phonetics. 4,115,932, Cl. 35-35.00J.

Charon, Clarence W.; and Renaud, Laurent C., to Owens-Corning Fiberglas Corporation. Method for making an electrically conductive paper. 4,115,917, Cl. 29-611.000.

Charter, Kenneth F.; Miller, John R.; and Garrett, David W., to Owens-Corning Fiberglas Corporation. High production method of producing glass fiber resin composites and articles produced thereby. 4,117,067, Cl. 264-119.000.

Chase, Richard P.: *See—*
Englander, Gary E.; Chase, Richard P.; Anderson, Donald P.; and Metcalf, Guy D., 4,115,958, Cl. 51-289.00R.

Chauvet, Pierre: *See—*
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Chavarria, Robert James; and Foster, Clark Berg, to C.F.F. Inc. Pool ball. 4,116,439, Cl. 273-59.00A.

Chem-Farm Inc.: *See—*
Lant, Lawrence L., 4,116,281, Cl. 172-267.000.
Sauer, Clement J., 4,116,139, Cl. 111-7.000.

Chemetron Corporation: *See—*
Wodzinski, Dale M.; and Clissa, Michael, 4,117,304, Cl. 219-130.100.

Chemi-Con Onkyo Co., Ltd.: *See—*
Miyanaga, Kunio; and Kawada, Kosaku, 4,117,275, Cl. 179-111.00E.

Chemische Werke Huls AG: *See—*
Kaufhold, Manfred; and Bankwitz, Gottfried, 4,117,251, Cl. 568-877.000.

Chemishe Fabrik Budenheim: *See—*
Beltz, Klaus; and Frankenfeld, Klaus, 4,117,092, Cl. 423-321.00S.

Chemplex Company: *See—*
Hwang, Yu-Tang, 4,117,217, Cl. 526-96.000.

Chen, Schoen-nan: *See—*
Deb, Satyendra K.; Chen, Schoen-nan; Witzke, Horst; Russak, Michael A.; and Reichman, Joseph, 4,117,210, Cl. 429-111.000.

Cheng, Tai Chun, to Firestone Tire & Rubber Company, The. Phosphonitrilic polymers with curability by sulfur accelerated cures or radiation cures. 4,116,785, Cl. 204-159.140.

Chernov, Boris Serafimovich: *See—*
Lezgintsev, Georgy Mikhailovich; Istoshin, Stanislav Jurievich; Belyavsky, Mikhail Anatolievich; Kontar, Evgeny Alexeevich; Koptyazhin, Nikolai Nikolaevich; Agaltsov, Georgy Ivanovich; Chernov, Boris Serafimovich; Ter-Saakov, Eduard Isaakovich; and Shkatov, Evgeny Petrovich, 4,116,069, Cl. 73-425.200.

Cherny, Viktor Yakovlevich; Galperin, Boris Grigorievich; Mikhailov, Mikhail Mikhailovich; Meljukhov, Vladimir Petrovich; and Dobrokhotov, Leonid Vasilievich. Turbomolecular high-vacuum pulp. 4,116,592, Cl. 417-424.000.

Chernyshev, Boris Alexandrovich: *See—*
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.

Chevalier, Georges: *See—*
Boy Marcotte, Jean-Louis; Chevalier, Georges; Gerij, Janusz; and Leheu, Jacques, 4,116,765, Cl. 176-38.000.

Chevron Research Company: *See—*
Abbott, Andrew Doyle; and Benoit, George J., 4,116,871, Cl. 252-32.70E.
de Vries, Louis, 4,116,873, Cl. 252-33.000.

Chiaramonte, Gasper, Jr. Removable shield for footwear. 4,115,933, Cl. 36-34.00B.

Chiba, Kensuke, to Sharp Rifle Company, Ltd. Pressurized gas or air operated repeater rifle. 4,116,193, Cl. 124-72.000.

Chidsey, Francis A., Jr.: *See—*
Bell, Richard L.; Josephs, Patricia A.; and Chidsey, Francis A., Jr., 4,116,378, Cl. 229-87.00F.

Chimura, Yuichi: *See—*
Tonouchi, Takeo; Tonouchi, Akio; Shiroshima, Makoto; Chimura, Yuichi; and Ohkubo, Kazuyoshi, 4,117,174, Cl. 426-634.000.

Chin, Arthur H. T.: *See—*
Duncan, Anthony Bruce; and Chin, Arthur H. T., 4,116,471, Cl. 285-1.000.

Chlanda, Frederick P.; Lee, Lester T. C.; and Liu, Kang-Jen, to Allied Chemical Corporation. Bipolar membranes and method of making same. 4,116,889, Cl. 521-27.000.

Chloride Silent Power Limited: *See—*
Jones, Ivor Wynn, 4,117,056, Cl. 264-57.000.
Markin, Trevor Leslie; Bones, Roger John; Scott, Keith Taylor; May, Geoffrey John; and Robinson, Graham, 4,117,209, Cl. 429-104.000.

Chlorine Engineers Corp., Ltd.: *See—*
Ichisaka, Teruo; and Ikegami, Tadao, 4,116,805, Cl. 204-290.00F.

Choi, Charles K., to Occidental Petroleum Corporation. Vessel for stripping oil from fluidized ash and char particles. 4,116,823, Cl. 209-44.000.

Chorley, Bernard John: *See—*
Bell, Donald Atkinson; Chorley, Bernard John; Parks, John Ronald; and Wanek, Robert Lewis, 4,117,539, Cl. 364-551.000.

Christ, Alfred: *See—*
Lehmann, Rolf; and Christ, Alfred, 4,116,601, Cl. 425-324.100.

Christiansen, Arvid, to Miranol Chemical Company, Inc., The. Nitrogenous condensation products. 4,117,231, Cl. 548-352.000.

Christopher, Glenn B.; and Regalbuto, John A., to Jet Research Center, Inc. Methods and apparatus for severing tubular members. 4,116,130, Cl. 102-20.000.

Chromalloy American Corporation: *See—*
Eglinton, Robert B.; and Tuell, James S., 4,116,327, Cl. 198-560.000.

Chu, Tze Yao; Jaluria, Yogesh; Lavigna, Robert Joseph; Reusser, Raymond Edward; and Williams, George, to Western Electric Company, Inc. Method and apparatus for avoiding undesirable deposits in crystal growing operations. 4,116,642, Cl. 422-249.000.

Church & Dwight Co., Inc.: *See—*
Schoenholz, Daniel; Petersen, Arthur Walter; and Northup, Marcus Allen, Jr., 4,116,848, Cl. 252-90.000.

Chytil, Frank S.: *See—*
Smith, Robert E.; Chytil, Frank S.; Feldstein, George; and Swartz, Dorman J., 4,116,394, Cl. 242-25.00R.
Ciba-Geigy AG: *See—*
Loewe, Werner; and Striebel, Heini Paul, 4,117,156, Cl. 424-302.000.
Mollet, Hans; Haberli, Roland; Rabassa, Alberto; and Babler, Fridolin, 4,117,066, Cl. 264-117.000.
Ciba-Geigy Corporation: *See—*
Beffa, Fabio; Back, Gerhard; and Steiner, Eginhard, 4,116,952, Cl. 260-145.00B.
Bitterlin, Otto; and Beffa, Fabio, 4,116,624, Cl. 8-42.00B.
Desai, Nalin Binduprasad; and Ramanathan, Visvanathan, 4,116,965, Cl. 260-294.900.
Dexter, Martin; Knell, Martin; Klemchuk, Peter; and Stephen, John F., 4,116,930, Cl. 260-45.80N.
Fischer, Hanspeter, 4,116,675, Cl. 71-93.000.
Koller, Josef; and Koller, Stefan, 4,116,622, Cl. 8-25.000.
Lehmann, Hans; and Zondler, Helmut, 4,117,038, Cl. 260-837.00R.
Ramey, Chester E.; and Luzzi, John J., 4,116,933, Cl. 260-45.75N.
Rohringer, Peter; Lohmann, Frank; and Wurster, Rudolf F., 4,116,702, Cl. 106-15.0FP.
von der Crone, Jost, 4,116,959, Cl. 544-284.000.
Cimarusti, Christopher M.; Grabowich, Paul; and Varma, Ravi K., to E. R. Squibb & Sons, Inc. D-Homo oxasteroids. 4,116,978, Cl. 260-345.200.
Cincinnati Milacron Inc.: *See—*
Forney, Richard Davidson; Hernandez, Richard Samuel; and Curless, Richard Anderson, 4,116,586, Cl. 417-41.000.
McDonald, David Ian, 4,116,325, Cl. 198-484.000.
Cipriani, Gioacchino; and Neri, Carlo, to Anic, S.p.A. Method for the preparation of carbonic acid monoester salts. 4,116,997, Cl. 260-463.000.
Ciszek, Theodore Frank, to International Business Machines Corporation. Apparatus for pulling crystal ribbons from a truncated wedge shaped die. 4,116,641, Cl. 422-246.000.
Citizen Watch Company Limited: *See—*
Ebihara, Heihachiro; and Sekiya, Fukuo, 4,117,475, Cl. 340-336.000.
Clark, Andrew Greive. Electrical socket. 4,117,310, Cl. 219-451.000.
Clark Equipment Company: *See—*
Duttarer, Ralph M., 4,116,486, Cl. 298-17.00R.
Clark, Norman Owen; and Watson, James Henry Peter, to English Clays Lovering Pochin & Company Limited. Magnetic separation, method and apparatus. 4,116,829, Cl. 210-42.00S.
Clark, Richard Paul: *See—*
Zimmerman, Gary Lee; Clark, Richard Paul; and Rehm, John A., 4,116,520, Cl. 339-59.00R.
Clarke, John A., to U.S. Philips Corporation. Optical viewing device of the periscope type with rotating means for focussing. 4,116,528, Cl. 350-52.000.
Clay, Burton Ross; and Burton, Gardner Thomas, to RCA Corporation. Double modulation holographic recording technique. 4,116,526, Cl. 350-3.670.
Clerk, Ernest Joscelyn. Spray nozzle for atomizing a liquid by directing it against an obstruction and having it mix with air. 4,116,382, Cl. 239-8.000.
Cleveland, William K. S.; Webb, Jimmy L.; and Orlando, Charles M., to General Electric Company. Method for dehydrochlorinating 1,1,1,-trichloro-2,2-bis(4-hydroxyphenyl)ethane and products obtained therefrom. 4,117,018, Cl. 568-726.000.
Clissa, Michael: *See—*
Wodzinski, Dale M.; and Clissa, Michael, 4,117,304, Cl. 219-130.100.
Coates Brothers & Co., Ltd.: *See—*
Hudson, Alan George; and Tawn, Alec Richard Hornsey, 4,117,241, Cl. 560-224.000.
Coberly, Charles W.; and Lewis, Howard A., to Foster, James M. High frequency probe. 4,116,523, Cl. 339-108.0TP.
Coggins, Dolphus L.; and Gumbelevicius, John, to McDonnell Douglas Corporation. Chem-milling of titanium and refractory metals. 4,116,755, Cl. 156-659.000.
Cogley, Robert W., Jr., to Armstrong Cork Company. Method and apparatus for determining the density of dry fibers. 4,116,072, Cl. 73-433.000.
Cohen, Hannah M.: *See—*
Cohen, Norman E.; and Cohen, Hannah M., 4,116,553, Cl. 353-31.000.
Cohen, Marvin P.: *See—*
von Strandtmann, Max; Cohen, Marvin P.; Klutchko, Sylvester; and Shavel, John, Jr., 4,116,971, Cl. 260-308.00D.
Cohen, Norman E.; and Cohen, Hannah M. Display method and apparatus. 4,116,553, Cl. 353-31.000.
Cohen, Richard L.; and Anderson, Richard J., to Bendix Corporation, The. Digital continuous potentiometer servo feedback element. 4,117,386, Cl. 318-664.000.
Coil Sales & Manufacturing Company: *See—*
Charles, Joseph T.; and Ryan, James P., 4,117,264, Cl. 179-1.0PC.
Coispeau, Gerard Emile Edgard; and Pechmeze, Jacques Pierre Edmond, to Produits Chimiques Ugine Kuhlmann. 5-[4-(N-trifluoroethyl-amino)phenylazo]-pyrazolium dyestuffs. 4,116,954, Cl. 260-162.000.
Colbert, Gilbert L.: *See—*
Davis, Edgar D.; and Colbert, Gilbert L., 4,116,816, Cl. 208-209.000.
Coldren, Larry Allen; Glass, Alastair Malcolm; and Lemons, Ross Alan, to Bell Telephone Laboratories, Incorporated. Acoustic wave devices. 4,117,424, Cl. 333-30.00R.
Cole, Herbert S., Jr.: *See—*
Aftergut, Siegfried; and Cole, Herbert S., Jr., 4,116,861, Cl. 252-299.000.
Cole, Leon Jay: *See—*
Morris, Jerry M.; Cole, Leon Jay; and Rawls, Vaughn, 4,116,256, Cl. 157-13.000.
Cole Resdevel Corp.: *See—*
Cole, William, Jr.; and Preis, William R., 4,115,876, Cl. 4-317.000.
Cole, William, Jr.; and Preis, William R., to Cole Resdevel Corp. Self-contained recirculating toilet system. 4,115,876, Cl. 4-317.000.
Coleman, William Martin John: *See—*
Hussey, Dennis Malcolm; and Coleman, William Martin John, 4,117,383, Cl. 318-206.00A.
Coletti, Veronica L.: *See—*
Burghard, Clement E.; and Coletti, Veronica L., 4,117,458, Cl. 340-146.1AL.
Colgate-Palmolive Company: *See—*
Kenkare, Divaker B.; Hall, Robert T., II; and Carson, John C., Jr., 4,116,354, Cl. 220-20.000.
Collins, Brian Stuart: *See—*
Hanna, Kheder Abdul Karim; and Collins, Brian Stuart, 4,117,491, Cl. 343-742.000.
Colten, Jerrold L., to Bristol Products, Inc. Heat sump system for building structures. 4,117,305, Cl. 219-213.000.
Columbia Chase Corporation: *See—*
Berthiaume, Camille, 4,116,610, Cl. 431-4.000.
Combustion Engineering, Inc.: *See—*
Prestridge, Floyd Leon, 4,116,790, Cl. 204-188.000.
Combustion Unlimited Incorporated: *See—*
Straitz, John F., III, 4,116,618, Cl. 431-202.000.
Cominco Ltd.: *See—*
Shimizu, Harry H., 4,116,725, Cl. 148-20.300.
Commercial Decal, Inc.: *See—*
Andrews, Ray, 4,117,182, Cl. 428-201.000.
Commissariat a l'Energie Atomique: *See—*
Berton, Yves; and Chauvet, Pierre, 4,116,863, Cl. 252-301.10W.
Bonnemay, Alain, 4,117,540, Cl. 364-602.000.
Boy Marcotte, Jean-Louis; Chevalier, Georges; Gerij, Janusz; and Leheu, Jacques, 4,116,765, Cl. 176-38.000.
Lansiart, Alain; Morucci, Jean-Pierre; and Seigneur, Alain, 4,117,330, Cl. 250-361.00R.
Communications Satellite Corporation: *See—*
Ali, Mian Zaheer, 4,117,541, Cl. 364-724.000.
Compagnie Francaise de Raffinage: *See—*
Weisang, Joseph Edouard; and Engelhard, Philippe, 4,116,870, Cl. 252-439.000.
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Compagnie International pour l'Informatique Cii-Honeywell Bull (Societe Anonyme): *See—*
Delorme, Raymond Louis; and Grosjean, Henri, 4,116,376, Cl. 228-170.000.
Compair Construction and Mining Limited: *See—*
Barber, Antony Dobson; and Fisher, Zdenek, 4,116,409, Cl. 248-2.000.
Comstedt, Anders Per Philip, to AB Scaniainventor. Apparatus for indicating the loading of an electric AC motor. 4,117,408, Cl. 328-133.000.
Comul Scope Company: *See—*
Wilkenloh, Frederic Nash, 4,117,260, Cl. 174-106.00R.
Conger, William W., IV: *See—*
Johnson, Lawrence E.; Conger, William W., IV; and Moreland, Gerald W., 4,115,878, Cl. 4-172.170.
Conner, Alvin J., Sr. Metal corrosion inhibitor. 4,116,701, Cl. 106-14.140.
Connor, David T.; and von Strandtmann, Maximilian, to Warner-Lambert Company. 4,5-Dihydro-4,5-dioxo-1H-1-benzopyrano (2,3-B)-pyridine-3-carboxylic acids, salts and esters. 4,117,134, Cl. 424-256.000.
Conrow, Ransom Brown; and Bernstein, Seymour, to American Cyanamid Company. Substituted aromatic naphthalene sulfonamides. 4,117,003, Cl. 260-510.000.
Consolidated Foods Corporation: *See—*
Crowder, John V., 4,116,369, Cl. 222-145.000.
Consolidated Natural Gas Service Company: *See—*
Syska, Andrew J., 4,116,611, Cl. 431-353.000.
Constant, James Nickolas. Sidelooking radar and system for identifying objects. 4,117,481, Cl. 343-6.5SS.
Container Corporation of America: *See—*
Bell, Richard L.; Josephs, Patricia A.; and Chidsey, Francis A., Jr., 4,116,378, Cl. 229-87.00F.
Continental Group, Inc., The: *See—*
Josephy, Karl, 4,116,359, Cl. 220-265.000.
Continental Oil Company: *See—*
Bendig, Larry L.; Siemsen, Cathy S.; and Stowell, Donald E., 4,116,882, Cl. 252-448.000.
Bendig, Larry L.; and Scamehorn, John F., 4,117,106, Cl. 423-630.000.
Fair, Delbert W., 4,116,301, Cl. 181-119.000.
Starks, Charles M.; and Lundeen, Allan J., 4,117,243, Cl. 568-744.000.
Yang, Kang; and Scamehorn, John F., 4,117,085, Cl. 423-264.000.

Control Data Corporation: *See*—
Miller, Charles Newell, 4,117,068, Cl. 264-130.000.
Cook, Harold L., Jr.; Geer, Ernest C.; and Katz, Donald L., to Transco Energy Company. Method for increasing the recovery of natural gas from a geo-pressured aquifer. 4,116,276, Cl. 166-314.000.
Cooper, Glenn Dale; and Floryan, Daniel Edwin, to General Electric Company. Intrinsic viscosity control of polyphenylene ether reaction mixtures. 4,116,939, Cl. 528-215.000.
Cooper, Roydon B., to Pall Corporation. Unidirectional flow control valve. 4,116,212, Cl. 137-220.000.
Cooper Tire & Rubber Company: *See*—
Currie, Raymond L., 4,116,744, Cl. 156-352.000.
Cope, Leonard D.: *See*—
Baer, Ralph H.; and Cope, Leonard D., 4,117,511, Cl. 358-83.000.
Coran, Aubert Y.; and Patel, Raman P., to Monsanto Company. Elastoplastic compositions of ethylene-vinyl acetate rubber and polyolefin resin. 4,116,914, Cl. 260-30.60R.
Corban Industries, Inc.: *See*—
Lass, Harold M., 4,116,748, Cl. 156-526.000.
Corella, Arthur P. Reinforcing insert for collapsible packages. 4,115,909, Cl. 229-48.00R.
Corneli, Philip R.: *See*—
Godar, Richard L.; and Corneli, Philip R., 4,116,812, Cl. 208-48.0AA.
Cornelissen, Gerardus Antonius Petrus Maria: *See*—
Jacobs, Cornelis Adrianus Joannes; Driessen, Antonius Jozephus Gerardus Cornelis; and Cornelissen, Gerardus Antonius Petrus Maria, 4,117,370, Cl. 315-35.000.
Cornell, Charles R.: *See*—
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Corning Glass Works: *See*—
Adrion, Robert F.; Buck, Robert T.; and Eppes, William R., 4,117,338, Cl. 250-461.00R.
Boyd, David C.; Flannery, James E.; Morgan, David W.; Rosplock, Sara E.; and Sczerbaniewicz, Stella A., 4,116,704, Cl. 106-54.000.
Elmer, Thomas H., 4,116,657, Cl. 65-23.000.
Ortabasi, Ugur, 4,116,225, Cl. 126-271.000.
Powell, William E.; and Magner, Richard G., 4,116,565, Cl. 356-105.000.
Stempin, John L.; and Wexell, Dale R., 4,116,703, Cl. 106-75.000.
Coron, Noel: *See*—
Leblanc, Jacques; Dambier, Gerard; Coron, Noel; and Moalic, Jean-Pierre, 4,116,063, Cl. 73-355.00R.
Cosack, Claus: *See*—
Hein, Wolfgang; Cosack, Claus; and Grundmann, Peter, 4,116,844, Cl. 210-446.000.
Costanzo Bus Bath, Inc.: *See*—
Costanzo, Dean V., 4,115,896, Cl. 15-301.000.
Costanzo, Dean V., to Costanzo Bus Bath, Inc. Vehicle interior cleaning system. 4,115,896, Cl. 15-301.000.
Couchoud, Paul, to Rhone-Poulenc-Textile. Aromatic polyphenyl phosphonates. 4,117,042, Cl. 260-930.000.
Courvoisier, Guy, to Nuova San Giorgio S.p.A. Doffing device for spinning machines. 4,116,395, Cl. 242-35.50A.
Cousino, Walter F. Metal sawing or milling machine. 4,116,095, Cl. 82-71.000.
Cox, Van R. Earth drills. 4,116,284, Cl. 173-140.000.
Coy, Raymond Walter. Self actuating pendulum system. 4,115,996, Cl. 58-129.000.
Coyne & Bellier, Bureau d'ingenieurs Conseils: *See*—
Guerber, Paul Leon, 4,116,285, Cl. 175-7.000.
Craig, Gregory C., to French Oil Mill Machinery Company, The. Screw vent. 4,117,548, Cl. 366-83.000.
Cramers, Constant M. A.: *See*—
Balg, Theodorus; Cramers, Constant M. A.; and Maessen, Hendrikus J. G., 4,117,000, Cl. 260-465.100.
Crestetto, Giovanni, to ITT Industries, Inc. Automotive vehicle bumper. 4,116,480, Cl. 293-98.000.
Creus, Jose Humet. Pipe coupling. 4,116,473, Cl. 285-5.000.
Crisenbery, Richard T.; and Tinholt, Thomas H., to Eaton Corporation. Fluid flow restriction path in viscous fluid clutch. 4,116,318, Cl. 192-58.00B.
Cronauer, Donald C.; and Kehl, William L., to Gulf Research & Development Company. Process for hydrogenating a solid carbonaceous material with Ni/Ti/Mo on a mangesium-deficient magnesium aluminate spinel-as catalyst. 4,116,808, Cl. 208-10.000.
Crouzet, Henri: *See*—
Bieniok, Joachim; and Crouzet, Henri, 4,115,986, Cl. 57-77.300.
Crowder, John V., to Consolidated Foods Corporation. Apparatus for making frozen confections. 4,116,369, Cl. 222-145.000.
Crowe, Arthur E., Jr. Golf practice sighting device. 4,116,448, Cl. 273-186.00A.
Crowell, Douglas Hodgen: *See*—
Graham, Gordon Judson; Martin, John Frederick; and Crowell, Douglas Hodgen, 4,116,097, Cl. 83-155.000.
Csepel Muvek Hiradastechnikai Gepgyara: *See*—
Laib, Lajos; Komandi, Gyorgy; Polyak, Nandor; and Bolyky, Janos, 4,116,051, Cl. 73-116.000.
Culbertson, Samuel W.; and Polstra, James W., to Binks Manufacturing Company. Dispensing system for low stability fluids. 4,116,364, Cl. 222-40.000.
Cullen, John S.; and Huber, Paul W., to Multiform Desiccant Products, Inc. Self-retaining adsorbent bag unit. 4,116,649, Cl. 55-387.000.
Cummins, Peter Gerald; Sinton, Bernard; and Miller, Michael George, to Redland Claddings Limited. Bonded inorganic and fibrous material building product. 4,117,185, Cl. 428-241.000.
Curless, Richard Anderson: *See*—
Forney, Richard Davidson; Hernandez, Richard Samuel; and Curless, Richard Anderson, 4,116,586, Cl. 417-41.000.
Curley, Edward M.: *See*—
Kaplan, Sheldon; Curley, Edward M.; and Homan, Gerlof, 4,116,196, Cl. 128-272.300.
Curran, John F.: *See*—
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Currey, John E.; McLarty, Colin S.; and Porter, Donald H., to Hooker Chemicals & Plastics Corp. Electrolytic cell with reduced inter-electrode gap. 4,116,800, Cl. 204-252.000.
Currie, Raymond L., to Cooper Tire & Rubber Company. Control apparatus for a tire building machine. 4,116,744, Cl. 156-352.000.
Curro, Thomas R.: *See*—
Leanna, Dale D.; Jorgensen, Allen R.; Curro, Thomas R.; and Bray, Andrew M., 4,116,594, Cl. 425-3.000.
Curry, Byron V.; and Bonkowski, Teofil L. Heat installed multi-pack carrier, machine and method. 4,116,331, Cl. 206-150.000.
Curry, John C.: *See*—
Owen, Ronald C.; and Curry, John C., 4,116,205, Cl. 132-85.000.
Customcolor, Inc.: *See*—
Muller, Bruce M., 4,116,909, Cl. 260-23.70R.
Czerepinski, Ralph G.: *See*—
Garrett, Walter L.; Friedrich, Ralph E.; and Czerepinski, Ralph G., 4,116,896, Cl. 260-17.00R.
Dai Nippon Printing Co., Ltd.: *See*—
Minami, Kazuto; Tsukui, Norihiko; and Imamoto, Tsunehiko, 4,117,181, Cl. 428-138.000.
Dai Nippon Toryo Co. Ltd.: *See*—
Kagami, Akiyasu; Hase, Takashi; Mimura, Yoshiyuki; Narita, Kinichiro; and Hiraki, Minoru, 4,116,864, Cl. 252-301.60S.
Daido-Maruta Finishing Co., Ltd.: *See*—
Yamamoto, Kazuhide, 4,116,625, Cl. 8-120.000.
Dalbow, Milton H.; Acevedo, Hernan F.; and Slifkin, Malcolm, to International Radioimmune Systems, Inc. Diagnostic blood test and kit for detecting human chorionic gonadotropin. 4,116,776, Cl. 195-103.700.
Dallas County Association for the Blind: *See*—
Ballew, Audrey H., 4,115,895, Cl. 15-229.00R.
Dalzell, Charles J. Solid fuel package with igniter. 4,116,645, Cl. 44-38.000.
Dalzell, Haldean Cloyce: *See*—
Razdan, Raj Kumar; and Dalzell, Haldean Cloyce, 4,116,979, Cl. 260-345.300.
Dambier, Gerard: *See*—
Leblanc, Jacques; Dambier, Gerard; Coron, Noel; and Moalic, Jean-Pierre, 4,116,063, Cl. 73-355.00R.
Danfoss A/S: *See*—
Iversen, Poul Christian Carlos; Thorsoe, Flemming; and Hanson, Borge Bernhard, 4,117,307, Cl. 219-364.000.
Daniels, Peter J. L., to Schering Corporation. Aminoacyl derivatives of aminoglycoside antibiotics. 4,117,221, Cl. 536-17.000.
Darrell, Robert William, to Bigfoot Industries, Inc. Board game apparatus. 4,116,450, Cl. 273-249.000.
Dart Industries Inc.: *See*—
Henke, Fred G.; and Spoeth, Carl R., Jr., 4,117,045, Cl. 261-30.000.
Das, Pankaj K.: *See*—
Tiersten, Harry F.; McDonald, John F.; and Das, Pankaj K., 4,117,074, Cl. 310-320.000.
Data General Corporation: *See*—
Elliott, Alan E., 4,117,470, Cl. 340-324.0AD.
Datanetics Corporation: *See*—
Kim, Kirk J.; and Muller, Michael, 4,117,438, Cl. 336-75.000.
Daubin, Scott C. Compliant underwater pipe system. 4,116,009, Cl. 114-264.000.
Dauvergne, Hector A. Diaphragm activated toilet. 4,115,883, Cl. 4-353.000.
David Brown Tractors Limited: *See*—
Ashfield, Herbert Edward, 4,116,322, Cl. 192-48.800.
David, Samuel: *See*—
Thies, Peter Willibrord; and David, Samuel, 4,117,148, Cl. 424-278.000.
Davidson, Donald H.: *See*—
Hsueh, Limin; Hard, Robert A.; Davidson, Donald H.; and Huff, Ray V., 4,116,488, Cl. 299-4.000.
Davis, Charles E. Water cushion and method of using the same. 4,115,885, Cl. 5-349.000.
Davis, Charles S., to Russo, Leonard, a part interest. Sealing device. 4,116,352, Cl. 215-270.000.
Davis, Delbert A., to Burlington Industries, Inc. Nylon or polyester slip set fabric chemically treated to adhere neoprene, EPDM or butyl film. 4,116,743, Cl. 156-333.000.
Davis, Edgar D.; and Colbert, Gilbert L., to Phillips Petroleum Company. Parallel hydrodesulfurization of naphtha and distillate streams with passage of distillate overhead as reflux to the naphtha distillation zone. 4,116,816, Cl. 208-209.000.
Davis, Gordon Peter, to EMI Limited. Radiation detectors. 4,117,366, Cl. 313-95.000.
Davis, Kenneth G., to Mobil Oil Corporation. Water-based coating composition containing polyvinyl chloride. 4,116,905, Cl. 260-22.0CB.
Davis, Michael, to Airway Industries, Inc. Luggage case. 4,116,311, Cl. 190-49.000.

Davy Powergas GmbH: *See*—
Fechner, Joachim; Fiebig, Siegward; Fischer, Friedrich; Fischer, Herbert; Hellmer, Lars; Riedel, Konrad; Stauffer, Adolf; and Sud, Kuldip, 4,117,101, Cl. 423-569.000.
Hellmer, Lars; Koller, Gerald; Al Muddarris, Ghazi Rashid; and Sud, Kuldip Kumar, 4,117,100, Cl. 423-569.000.

Dayton-Walther Corporation: *See*—
Walther, William D., 4,116,489, Cl. 301-12.00R.

De La Rue Crosfield Limited: *See*—
Winchester, Roy E.; Marjoran, Michael J.; and O'Brien, Roger, 4,116,430, Cl. 271-177.000.

De Staat der Nederlanden, Te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie: *See*—
Ampt, Cornelis Georg Frederik; and Keimpema, Keimpe Klaas, 4,117,315, Cl. 235-88.00R.

DeAngelis, William M., to Allen, Henry; and Garbarini, Charles J., Jr. Chromatographic column. 4,116,836, Cl. 210-198.00C.

Deb, Satyendra K.; Chen, Schoen-nan; Witzke, Horst; Russak, Michael A.; and Reichman, Joseph, to Optel Corporation; and Grumman Aerospace Corporation. Photogalvanic cell having transparent photoactive TiO_2 thin film. 4,117,210, Cl. 429-111.000.

de Bie, Jan Rudolf; Ekkelboom, Tjepke Hendrik; Geytenbeek, Johannes Jacobus Franciscus; van Hoorn, Willem Lodewijk; and Schob, Otmar, to U.S. Philips Corporation. High-pressure discharge lamp. 4,117,367, Cl. 313-352.000.

de Boer, Eeltje, to U.S. Philips Corporation. Color television system for recording line sequential signals with 90° phase shift. 4,117,509, Cl. 358-4.000.

Dec International, Inc.: *See*—
Quee, Jack A., 4,116,756, Cl. 159-45.000.

DeConinck, Wilfried Rene'; and Goret, Jean Louis Ernest Raymond, to U.S. Philips Corporation. Phase-locked loop with switchable loop filter. 4,117,420, Cl. 331-17.000.

Deere & Company: *See*—
Barnes, Theodore Marion; Shindelar, Joseph John; Bass, Merlyn Duane; and Suechting, Henry William, Jr., 4,115,983, Cl. 56-98.000.
Rehn, Gary Allen; and Taube, Robert Otto, 4,116,280, Cl. 172-266.000.

Degiez, Louis: *See*—
Hurzeller, Peter; and Degiez, Louis, 4,117,283, Cl. 200-52.00R.

Degremont: *See*—
Tardivel, Jacques, 4,116,832, Cl. 210-83.000.

De Jong, Herman Lambertus, to U.S. Philips Corporation. Sensor device. 4,116,795, Cl. 204-195.00S.

Dejour, Henri: *See*—
Rambert, Andre; Bousquet, Gilles; and Dejour, Henri, 4,115,875, Cl. 3-1.913.

Del Monte Corporation: *See*—
Taylor, Paul G.; Son, Chung H.; Hom, Martha C.; Williams, L. G.; and Steel, Ronald E., 4,117,176, Cl. 426-660.000.

DeLee, Barry. Clamping device for display structures. 4,115,966, Cl. 52-148.000.

De Lepeleire, Guido Amandus. Counter-current bumped plates heat exchanger. 4,116,271, Cl. 165-166.000.

DELMA, elektro und medizinische Apparatebaugesellschaft m.b.H.: *See*—
Roos, Eberhard, 4,116,198, Cl. 128-303.150.

Delorme, Raymond Louis; and Grosjean, Henri, to Compagnie International pour l'Informatique Cii-Honeywell Bull (Societe Anonyme). Method of mounting integrated circuit chips on a substrate and apparatus for carrying out the method. 4,116,376, Cl. 228-170.000.

DeLuca, Paul V.: *See*—
Gautier, Charles L.; DeLuca, Paul V.; and Atun, Albert, 4,117,273, Cl. 179-98.000.

Demarest, Donald Monroe; and Chandler, Edgar Frank, to General Electric Company. Solid state valve thermal protection for HVDC power converters. 4,117,527, Cl. 361-103.000.

den Hollander, Willem, to RCA Corporation. Transformer arrangement for synchronously switched vertical deflection system. 4,117,380, Cl. 315-393.000.

DeNigris, Ernest Gerard; Girardi, Joseph; and Ruehl, William Edwin, to Illinois Tool Works; and Bell Telephone Laboratories, Incorporated. Terminal bridging assembly. 4,116,524, Cl. 339-113.00R.

Denki Onkyo Co., Ltd.: *See*—
Masuda, Noboru; Nishino, Yu; and Kase, Hiroaki, 4,117,523, Cl. 360-110.000.
Shizu, Kazunori, 4,117,432, Cl. 335-210.000.
Yasuhara, Yukihiko, 4,117,516, Cl. 358-248.000.

Denney, Roger W.: *See*—
Nerem, Marvin E.; and Denney, Roger W., 4,116,457, Cl. 280-166.000.

Deno, Norman C., to Fats and Proteins Research Foundation, Inc. Method of hydroxylation. 4,116,987, Cl. 260-410.90R.

DePagter, Glenn H., to Gardner-Denver Company. Drive mechanism for power ratchet wrench. 4,116,093, Cl. 81-57.390.

de Ridder, Adriaan Jan: *See*—
Kuus, Gijsbert; and de Ridder, Adriaan Jan, 4,117,369, Cl. 313-178.000.

Derstadt, Donna M.; and Moeser, Douglas W., to Procter & Gamble Company, The. Anionic surfactant-containing detergent compositions having soil-release properties. 4,116,885, Cl. 252-532.000.

Desai, Nalin Binduprasad; and Ramanathan, Visvanathan, to Ciba-Geigy Corporation. Styryl dyestuffs containing certain amino, cyanopyridine moieties. 4,116,965, Cl. 260-294.900.

DeSantis, Charles M.: *See*—
Arnold, James J., deceased; Campbell, Donn V.; DeSantis, Charles M.; and Schwering, Felix, 4,117,490, Cl. 343-708.000.

Descamps, Marcel; and Goldenberg, Charles, to Labaz. Therapeutic sulfonamides. 4,117,151, Cl. 424-285.000.

De Simone, Renato; Platone, Edoardo; and Morelli, Morello, to Anic, S.p.A. Acetylenic alcohols, their derivatives and process for their production. 4,117,249, Cl. 568-855.000.

DeSoto, Inc.: *See*—
Gatechair, Leslie, 4,116,787, Cl. 204-159.230.
Sekmakas, Kazys; and Shah, Raj, 4,116,901, Cl. 260-19.0UA.

Despatch Industries, Inc.: *See*—
Melgaard, Hans L., 4,116,612, Cl. 431-76.000.

Deutsch, Ralph, to Deutsch Research Laboratories, Ltd. Pulse width modulation in a digital tone synthesizer. 4,116,103, Cl. 84-1.240.

Deutsch Research Laboratories, Ltd.: *See*—
Deutsch, Ralph, 4,116,103, Cl. 84-1.240.

Deutsche Automobilgesellschaft GmbH: *See*—
Plust, Heinz; and Gutmann, Gunter, 4,117,206, Cl. 429-101.000.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See*—
Klenk, Herbert; and Offermanns, Heribert, 4,117,008, Cl. 260-545.00R.

Deutsche Gold-und Silber-Scheideanstalt vormals Roessler: *See*—
Ackermann, Rolf; Felber, Wilfried; and Morlock, Gerhard, 4,117,238, Cl. 560-217.000.
Klebe, Hans; Knippschild, Gerd; and Schuster, Hubert, 4,117,097, Cl. 423-415.00P.

Deutscher, Fritz; and Leitner, Robert, to Lever Brothers Company. Detergent composition. 4,116,878, Cl. 252-94.000.

Deval Industries, Inc.: *See*—
Atchley, Raymond D.; Barr, John E.; and Pegram, John B., 4,116,348, Cl. 214-309.000.

Devine, Arthur, Jr.: *See*—
Varga, Theodore; Devine, Arthur, Jr.; and Meikle, Warren, 4,116,424, Cl. 269-55.000.

de Vries, Louis, to Chevron Research Company. Lubricating oil composition containing Group I or Group II metal or lead sulfonates. 4,116,873, Cl. 252-33.000.

DeWoskin, Kenneth J., to Beltx Corporation. Drapery pleating tape and its manufacture. 4,117,180, Cl. 428-35.000.

Dexter, Martin; Knell, Martin; Klemchuk, Peter; and Stephen, John F., to Ciba-Geigy Corporation. Pyromellitic diimides of 3,5-dialkyl-4-hydroxyphenylsubstituted amines. 4,116,930, Cl. 260-45.80N.

Dhingra, Yog R.: *See*—
Bredeweg, Robert A.; and Dhingra, Yog R., 4,117,007, Cl. 260-544.00Y.

Diamond Crystal Salt Company: *See*—
Leverenz, Melvin E., 4,116,640, Cl. 422-264.000.

Diamond, Julius; and Zalipsky, Jerome J., to William H. Rorer, Inc. Amidinoureas. 4,117,165, Cl. 424-322.000.

Diamond Shamrock Corporation: *See*—
Dorio, Martin M.; and Stacey, Alan J., 4,116,781, Cl. 204-98.000.
Peters, Edward J., 4,116,807, Cl. 204-290.00F.

Dickey, George W. Simulated baseball game. 4,116,442, Cl. 273-89.000.

Diebold, James P., to United States of America, Navy. Use of high energy propellant in gas generators. 4,115,999, Cl. 60-219.000.

Dieck, Ronald L.; Garrett, Thomas B.; and Magnusson, Alan B., to Armstrong Cork Company. Catalytic process for the preparation of phosphazene polymers. 4,116,891, Cl. 521-89.000.

Diehl, Robert J.; and Houlgrave, Robert C., to ACF Industries, Incorporated. Limited float seat construction for expanding gate valve. 4,116,419, Cl. 251-196.000.

Di Liddo, Natale, to Instituto Grafico Bertello S.p.A. Automatic filing cabinet retrieval apparatus. 4,116,511, Cl. 312-268.000.

Dillenburg, Helmut; Moser, Wilhelm; and Jones, Robert, to Peroxid-Chemie GmbH. Process for preparing stabilized sodium percarbonate. 4,117,087, Cl. 423-275.000.

Dilworth, Donald C., to Honeywell Inc. Thermal compensation apparatus. 4,116,537, Cl. 350-253.000.

Dimensional Products Limited: *See*—
Nerlich, Gunter, 4,116,533, Cl. 350-135.000.

Dimroth, Peter; Junge, Helmut; Tonne, Peter; and Urtel, Rolf, to BASF Aktiengesellschaft. Azo dyes. 4,116,953, Cl. 260-157.000.

Dines, Jack E., to Jet Research Center, Inc. Method and apparatus for forming internal recesses in a hollow body. 4,116,110, Cl. 90-12.00R.

Dinter, Peter; Kolbe, Andreas; and Guckes, Reinhold, to Hoechst Aktiengesellschaft. Coating device. 4,116,162, Cl. 118-104.000.

Discenza, Walter V., Jr.: *See*—
Boerstler, Leslie H.; Discenza, Walter V., Jr.; Marvin, Mason D.; and Ebersole, Theodore J., 4,117,344, Cl. 290-52.000.

Doane, William M.: *See*—
Fanta, George F.; and Doane, William M., 4,116,899, Cl. 260-17.4GC.

Dobrokhotov, Leonid Vasilievich: *See*—
Cherny, Viktor Yakovlevich; Galperin, Boris Grigorievich; Mikhailov, Mikhail Mikhailovich; Meljukhov, Vladimir Petrovich; and Dobrokhotov, Leonid Vasilievich, 4,116,592, Cl. 417-424.000.

Dobson, John J.: *See*—
Schisselbauer, John C.; and Dobson, John J., 4,117,314, Cl. 235-475.000.

Dr. Adolf Seebach AG: *See*—
Seebach, Adolf, 4,117,132, Cl. 424-253.000.

Dr. Ing. Hans Mueller: *See*—
Meier, Hanspeter, 4,116,842, Cl. 210-330.000.

Doktor, Elek: *See—*
Havas, Jeno; Doktor, Elek; Patko, Marton; and Pungor, Erno, 4,116,796, Cl. 204-195.00M.

Dolidze, Vladimir Romanovich: *See—*
Abramov, Ivan Egorovich; Gershanov, Felix Borisovich; Dolidze, Vladimir Romanovich; Zakharova, Nina Vasilievna; Liakumovich, Alexandr Grigorievich; Michurov, Jury Ivanovich; Popov, Vasily Dmitrievich; Rutman, Grigory Iosifovich; and Shalimova, Zoya Stepanovna, 4,117,244, Cl. 568-799.000.

DOM-Sicherheitstechnik GmbH & Co. KG: *See—*
Wolter, Heinz, 4,116,025, Cl. 70-358.000.

Dombrowski, Theodor; and Wittkopp, Helmut, to Wilhelm Hegenscheidt Gesellschaft mbH. Method and apparatus for centering a wheel set. 4,116,094, Cl. 82-8.000.

Dominguez, Ramon, to Solarex Corporation. Solar panel with mat base member. 4,116,207, Cl. 136-89.00H.

Donkervoort, Dorotheus, to Eerste Nederlandse Fabriek van Manometers BV. Control device for a central heating installation. 4,116,380, Cl. 237-8.00R.

Dooley, Philip G., Jr.; and Oakleaf, Sidney C., to Dynage, Incorporated. Programmable controller with hardwired backup connecting terminals and related control system using programmable controller and hardwired backup. 4,117,317, Cl. 235-307.000.

Doran, Byron L.: *See—*
Becker, Joseph T.; and Doran, Byron L., 4,115,951, Cl. 47-81.000.

Dorentruper Sand- und Thonwerker G.m.b.H.: *See—*
Florian, Rudolf, 4,117,052, Cl. 264-30.000.

Dorfman, Steven R., to L.J.N. Toys, Ltd. Pivoting target array game. 4,116,443, Cl. 273-95.00R.

Dorio, Martin M.; and Stacey, Alan J., to Diamond Shamrock Corporation. Rejuvenation of membrane type chlor-alkali cells by intermittently feeding high purity brines thereto during continued operation of the cell. 4,116,781, Cl. 204-98.000.

Dotson, Donald R.; and Smith, Ronald R. Skateboard ski. 4,116,455, Cl. 280-7.120.

Douglas, Robert H.; Forrester, Edward H.; and Murray, David, to Honeywell Inc. Time-out interface means. 4,117,459, Cl. 340-147.00R.

Dow Chemical Company, The: *See—*
Abdallah, Abdulmuniem H.; and Shea, Philip J., 4,117,146, Cl. 424-273.00R.
Bon, Charles K., 4,116,782, Cl. 204-147.000.
Bredeweg, Robert A.; and Dhingra, Yog R., 4,117,007, Cl. 260-544.00Y.
Erickson, Robert E.; and Krajewski, Richard M., 4,117,184, Cl. 428-224.000.
Garrett, Walter L.; Friedrich, Ralph E.; and Czerepinski, Ralph G., 4,116,896, Cl. 260-17.00R.
Heikel, Henrik R., 4,116,710, Cl. 106-290.000.
Juckniess, Paul R.; and Johnson, David R., 4,116,801, Cl. 204-247.000.
Lee, John M.; and Bauman, William C., 4,116,856, Cl. 252-184.000.
Lee, John M.; and Bauman, William C., 4,116,857, Cl. 252-184.000.
Lee, John M.; and Bauman, William C., 4,116,858, Cl. 252-184.000.
McKendry, Lennon H.; and Bland, Walter P., 4,116,672, Cl. 71-91.000.
Nelson, Donald Louis, 4,117,030, Cl. 260-837.00R.
Parks, Christ F.; and Nimerick, Kenneth H., 4,117,214, Cl. 427-220.000.
Steiner, Edwin C., 4,116,936, Cl. 526-286.000.
Sun, Yun Chung, 4,117,020, Cl. 260-668.00C.

Dow Corning Corporation: *See—*
Elias, Janet L.; Lee, Chi-Long; and Maxson, Myron T., 4,116,919, Cl. 260-37.0SB.
Hahn, James R., 4,117,028, Cl. 260-825.000.

Downing, Neil Hugh: *See—*
Towns, Edward Johnson; and Brown, Edward Morris, 4,116,371, Cl. 222-455.000.

Dragani, James J.; and Wise, David S., to Dragani, James J. Apparatus and method for document microfilming system. 4,116,560, Cl. 355-41.000.

Dragotta, Peter J. Apparatus for conveying objects one by one. 4,116,323, Cl. 198-453.000.

Drake, Charles A., to Phillips Petroleum Company. Pyrolysis of heavies formed in production of unsaturated dinitriles. 4,117,002, Cl. 260-465.80R.

Draxler, Walter E., to Arrow Pneumatic, Inc. Maintenance alarm actuator. 4,116,156, Cl. 116-70.000.

Dreitser, Genrikh Alexandrovich: *See—*
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.

Driessen, Antonius Jozephus Gerardus Cornelis: *See—*
Jacobs, Cornelis Adrianus Joannes; Driessen, Antonius Jozephus Gerardus Cornelis; and Cornelissen, Gerardus Antonius Petrus Maria, 4,117,370, Cl. 315-35.000.

Drori, Moshe, to CAV Limited. Fuel injection pumping apparatus. 4,116,186, Cl. 123-139.0AM.

Drower, Wilfred, to Litecraft Pty. Ltd. Trailer coupling. 4,116,460, Cl. 280-478.00R.

Drukier, Ira: *See—*
Goel, Jitendra; Narayan, Subrahmanyam Yegna; and Drukier, Ira, 4,117,301, Cl. 219-121.0EM.

Ducarre, Michel, to Rhone-Poulenc-Textile. New polyester-amides. 4,116,943, Cl. 528-292.000.

Dudley, Betty J.; and Williams, Joel L., to Becton, Dickinson and Company. Non-thrombogenic articles. 4,116,898, Cl. 260-17.40R.

Dudzik, Chester John, to Leesona Corporation. Voluminous filamentary yarn and method of manufacture. 4,115,990, Cl. 57-140.00R.

Dufort, Jacques L.; and Hermelin, Roger R., to Bureau de Recherches Geologiques et Minieres. Apparatus for the application of polymer films on a support. 4,116,749, Cl. 156-555.000.

Duhl, David N.: *See—*
Gell, Maurice L.; and Duhl, David N., 4,116,723, Cl. 148-3.000.

Dumar, William Lewis, Jr.: *See—*
Blevins, Gerald Glen; Dumar, William Lewis, Jr.; Hansen, Steven Royal; Hixson, Wayne Ellory; and Krezak, John Edward, 4,117,261, Cl. 174-164.000.

Dumont, Claude: *See—*
Nedelec, Lucien; Frechet, Daniel; and Dumont, Claude, 4,117,164, Cl. 424-330.000.

Duncan, Anthony Bruce, to HydroTech International, Inc. Method and apparatus for remotely attaching a riser pipe to an offshore structure. 4,116,015, Cl. 405-169.000.

Duncan, Anthony Bruce; and Chin, Arthur H. T., to HydroTech International, Inc. Quick operating connector for pipes or the like. 4,116,471, Cl. 285-1.000.

Dunkl, Franz S.: *See—*
Ross, Sidney D.; Dunkl, Franz S.; and Finkelstein, Manuel, 4,117,531, Cl. 361-433.000.

Dunstan, James M., to Acorn Building Components, Inc. Apparatus for feeding elongated extrusions. 4,116,597, Cl. 425-110.000.

Du Pont de Nemours, E. I., and Company: *See—*
Bigelow, John Howard, 4,116,697, Cl. 96-95.000.
Edwards, Donald William; and Gorondy, Emery John, 4,117,498, Cl. 346-74.100.
Fang, James Chen-Shang, 4,116,890, Cl. 521-28.000.
Gale, David Mark, 4,117,033, Cl. 260-860.000.
Guschl, Randolph Joseph, 4,117,041, Cl. 260-927.00N.
Needes, Christopher Roderick S., 4,116,804, Cl. 204-284.000.
Spolnicki, Jerzy, 4,115,989, Cl. 37-140.0BY.
Stinger, Henry Joseph, 4,117,189, Cl. 428-323.000.
Trehu, Yves Michel, 4,116,654, Cl. 65-3.00C.
Verma, Monica Harish, 4,116,904, Cl. 260-22.00R.

Durda, Stanley J.; and Gustafson, Walter D. Aerator. 4,117,044, Cl. 261-30.000.

Duren, Gottfried: *See—*
Unkelbach, Karl-Heinz; and Duren, Gottfried, 4,116,839, Cl. 210-222.000.

Durham, Harvey E. Fork lift load clamping and stabilizing device. 4,116,349, Cl. 214-654.000.

Durkoppwerke GmbH: *See—*
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Durling, Robert Edward: *See—*
Gancy, Alan Brian; and Durling, Robert Edward, 4,116,629, Cl. 422-13.000.

Durnell Engineering, Inc.: *See—*
Durnell, Morris S., 4,116,304, Cl. 182-2.000.

Durnell, Morris S., to Durnell Engineering, Inc. Aerial personnel lift including means for automatically controlling the position of the personnel bucket. 4,116,304, Cl. 182-2.000.

Duttarer, Ralph M., to Clark Equipment Company. Retractable rock guard for a dump truck body. 4,116,486, Cl. 298-17.00R.

Dutton, Edward E.; and Gorby, Jack, to Sea-Pac, Inc. Solid pack tuna canning machine. 4,116,600, Cl. 425-296.000.

Dykstra, Jerald P.: *See—*
Hudspeth, Emmett L.; Richardson, Philip C.; Neathery, John L., Jr.; Dykstra, Jerald P.; Boger, Allen D., Jr.; Sims, William B., Jr.; Hunt, Glenn E.; and Quisenberry, Tony M., 4,116,228, Cl. 128-2.00R.

Dyna Technology, Inc.: *See—*
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Dynage, Incorporated: *See—*
Dooley, Philip G., Jr.; and Oakleaf, Sidney C., 4,117,317, Cl. 235-307.000.

Dynamit Nobel Aktiengesellschaft: *See—*
Englander, Fritz; and Amort, Jurgen, 4,116,976, Cl. 260-343.30R.
Petersen, Egon Norbert; and Richtzenhain, Hermann, 4,116,934, Cl. 260-45.75B.

Dynascan Corporation: *See—*
Feldman, Harold, 4,117,400, Cl. 324-158.00T.

E. Merck: *See—*
Hesse, Reiner; Pratzer, Hans; Kieser, Manfred; and Edler, Gerhard, 4,116,628, Cl. 427-154.000.

E. R. Squibb & Sons, Inc.: *See—*
Cimarusti, Christopher M.; Grabowich, Paul; and Varma, Ravi K., 4,116,978, Cl. 260-345.200.
Ondetti, Miguel Angel; and Weisenborn, Frank Lee, 4,116,962, Cl. 260-293.630.

Earle, Michael; and Lenzen, Glenn H., Jr., to Caterpillar Tractor Co. Method for fusibly bonding a coating material to a metal article. 4,117,302, Cl. 219-121.0LM.

Eastfield Corporation: *See—*
Kremer, Carl P., Jr.; and Powers, Mark O., 4,116,387, Cl. 239-338.000.

Eastman Kodak Company: *See—*
Irick, Gether, Jr.; and Kelly, Charles A., 4,116,928, Cl. 260-45.8NZ.
Pond, David Martin, 4,116,929, Cl. 260-45.8NT.
Saxon, Daniel Isaiah; and Leonard, Vernon Leon, 4,115,908, Cl. 28-269.000.

Eaton Corporation: *See—*
Bradshaw, Cyril E., 4,116,182, Cl. 123-119.00A.
Crisenbery, Richard T.; and Tinholt, Thomas H., 4,116,318, Cl. 192-58.00B.
Gehrig, Robert G., 4,116,466, Cl. 280-736.000.
Knapp, Kenneth K.; and Cornell, Charles R., 4,116,002, Cl. 60-445.000.
Leimbach, Richard C., 4,117,281, Cl. 200-61.250.
Pleier, Walter J.; and Wahl, James A., 4,116,296, Cl. 180-101.000.
Streeter, Kenneth R., 4,116,316, Cl. 192-58.00A.
Streeter, Kenneth R., 4,116,317, Cl. 192-58.00B.
Zunkel, Richard L., 4,115,897, Cl. 16-49.000.

Ebata, Hitoshi: *See—*
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Ebersole, Theodore J.: *See—*
Boerstler, Leslie H.; Discenza, Walter V., Jr.; Marvin, Mason D.; and Ebersole, Theodore J., 4,117,344, Cl. 290-52.000.

Ebihara, Heihachiro; and Sekiya, Fukuo, to Citizen Watch Company Limited. Driver circuit for electrochromic display device. 4,117,475, Cl. 340-336.000.

Ecke, George G., to PPG Industries, Inc. Antifungal di(aryl)methyl alkyl sulfones. 4,117,168, Cl. 424-337.000.

Eckert, Rudolf J. A., to Shell Oil Company. Hydrogenated star-shaped polymer. 4,116,917, Cl. 260-33.6AQ.

Ecodyne Corporation: *See—*
Butterworth, Donald James, 4,116,840, Cl. 210-279.000.

Econolite Control Products Inc.: *See—*
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Eda, Yasuko: *See—*
Yamada, Hirotada; Okamura, Kosaku; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,117,126, Cl. 424-246.000.

Edge, Charles K.; and Nier, Thomas J., to PPG Industries, Inc. Submerged dam barriers for selective diversion of molten metal flow in a glass forming chamber. 4,116,661, Cl. 65-182.00R.

Edler, Gerhard: *See—*
Hesse, Reiner; Pratzer, Hans; Kieser, Manfred; and Edler, Gerhard, 4,116,628, Cl. 427-154.000.

Edmonds, James T., Jr.; and Scoggins, Lacey E., to Phillips Petroleum Company. Branched arylene sulfide polymer production. 4,116,947, Cl. 528-388.000.

Edwards, Donald William; and Gorondy, Emery John, to Du Pont de Nemours, E. I., and Company. Magnetic printing process and apparatus. 4,117,498, Cl. 346-74.100.

Edwards, James H., to Millipore Corporation. Filter unit. 4,116,646, Cl. 55-159.000.

Eerste Nederlandse Fabriek van Manometers BV: *See—*
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Eglinton, Robert B.; and Tuell, James S., to Chromalloy American Corporation. Transfer mechanism employing bodily extensible sling structure. 4,116,327, Cl. 198-560.000.

Egyesult Izzolampa es Villamossagi Rt.: *See—*
Horvath, Laszlo; Major, Ferenc; Gaal, Otto; and Lengyel, Sandor, 4,116,328, Cl. 198-648.000.

Ehrlich, Anthony G.: *See—*
Stark, Donald E.; Ehrlich, Anthony G.; and Guillaumin, Bruno, 4,117,529, Cl. 361-182.000.

Ehrlich, Marilyn Carol; and Schafersman, Roy Leonard, to Bell Telephone Laboratories, Incorporated. Service observing terminal. 4,117,278, Cl. 179-175.20C.

Eichelberger, Charles W.: *See—*
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Eichelberger, Warren Evan: *See—*
Hillier, Edward Lawrence; Graham, Glen Henry; and Eichelberger, Warren Evan, 4,117,035, Cl. 260-876.00B.

Eicher, Robert L., to General Equipment & Manufacturing Co., Inc. Magnetic proximity device. 4,117,431, Cl. 335-207.000.

Eidt, Scott H., to Texas Alkyls, Inc. Process for the simultaneous manufacture of dimethylaluminum chloride and alkylaluminum chlorides. 4,116,992, Cl. 260-448.00A.

Eilingsfeld, Heinz; Patsch, Manfred; Baur, Karl-Gerhard; and Ruehenbeck, Wolfgang, to BASF Aktiengesellschaft. Manufacture of o-benzyltoluenes. 4,117,019, Cl. 260-649.00R.

Eisai Co., Ltd.: *See—*
Tanaka, Satoru; and Watanabe, Hideaki, 4,117,228, Cl. 544-377.000.

Eisenberg, Melvin I.; Levy, Norman; and Beall, Glenn L., to Plasco, Inc. Combination catheter venting and urine sample collecting unit and method of making the same. 4,116,227, Cl. 128-2.00F.

Ekeborg, Bo Gunnar: *See—*
Hogberg, Lars Gunnar; and Ekeborg, Bo Gunnar, 4,116,249, Cl. 144-3.00D.

Ekkelboom, Tjepke Hendrik: *See—*
de Bie, Jan Rudolf; Ekkelboom, Tjepke Hendrik; Geytenbeek, Johannes Jacobus Franciscus; van Hoorn, Willem Lodewijk; and Schob, Otmar, 4,117,367, Cl. 313-352.000.

Elderbaum, Gilbert J. Medication for herpes simplex and canker sores. 4,117,120, Cl. 424-195.000.

Electric Power Research Institute, Inc.: *See—*
Baumann, Kai J., 4,117,357, Cl. 310-52.00R.
Moore, Curtis L., 4,117,525, Cl. 361-37.00C.
Staub, Fred W.; and Morgan, Peter A., 4,115,929, Cl. 34-10.000.
Wycklendt, Daniel A., 4,117,441, Cl. 337-295.000.

Electronic Fuel Saver, Inc.: *See—*
Hayward, Arthur, 4,116,183, Cl. 123-122.00F.

Elevator Industries: *See—*
Alley, Don B., 4,116,306, Cl. 187-29.00R.

Eli Lilly and Company: *See—*
Krumkalns, Eriks V., 4,116,665, Cl. 71-66.000.

Elias, Janet L.; Lee, Chi-Long; and Maxson, Myron T., to Dow Corning Corporation. Treatment of reinforcing silica. 4,116,919, Cl. 260-37.0SB.

Elkem-Spigerverket A/S: *See—*
Krogsrud, Harald, 4,116,830, Cl. 210-63.00R.

Elliott, Alan E., to Data General Corporation. Data bit compression system. 4,117,470, Cl. 340-324.0AD.

Elliott Brothers (London) Limited: *See—*
Lewis, Edward Lloyd, 4,116,655, Cl. 65-4.00B.

Ellis, A. Barry, to Azteca Corn Products Corporation. Combination package and display case. 4,116,330, Cl. 206-44.00R.

Elmer, Thomas H., to Corning Glass Works. Process for increasing the annealing point of 96% silica glass. 4,116,657, Cl. 65-23.000.

Elmore, Claudius C., Jr.: *See—*
Kussy, Frank W.; Elmore, Claudius C., Jr.; and Molesworth, Richard E., 4,117,290, Cl. 200-243.000.

Elrod, David W.: *See—*
Marshall, Vincent P.; Elrod, David W.; Koert, James M.; Reisender, Elizabeth A.; and Wiley, Paul F., 4,116,769, Cl. 195-51.00R.

Emerson Electric Co.: *See—*
Boggs, Alben C.; and Stover, John C., 4,117,308, Cl. 219-365.000.

Emery, Guy Charles. Process for the preparation of a master mixture for a powder composition with a polyvinyl chloride base. 4,116,908, Cl. 260-23.0XA.

EMI Limited: *See—*
Bates, Stephen Ronald, 4,117,336, Cl. 250-445.00T.
Davis, Gordon Peter, 4,117,366, Cl. 313-95.000.

Encoline (Process) Limited: *See—*
Farrow, Harold Frederick; and Rackstraw, Bernard Booth, 4,116,124, Cl. 101-170.000.

Endo, Tetsuhiko: *See—*
Inouye, Yoshinori; Kanamori, Hiromitsu; Tsuchida, Nobuo; Morishita, Syozo; and Endo, Tetsuhiko, 4,116,393, Cl. 242-1.000.

Engelhard, Philippe: *See—*
Weisang, Joseph Edouard; and Engelhard, Philippe, 4,116,870, Cl. 252-439.000.

Engelmann, Heinz: *See—*
Susdorf, Roman; and Engelmann, Heinz, 4,116,091, Cl. 74-801.000.

Engineering Systems Corporation: *See—*
Miller, Albert J., 4,117,462, Cl. 340-539.000.

Englander, Fritz; and Amort, Jurgen, to Dynamit Nobel Aktiengesellschaft. Method of preparing phthalide. 4,116,976, Cl. 260-343.30R.

Englander, Gary E.; Chase, Richard P.; Anderson, Donald P.; and Metcalf, Guy D., to Warner & Swasey Company, The. Method of cylindrical and shoulder grinding. 4,115,958, Cl. 51-289.00R.

Englander, Irvin S.: *See—*
Jepsky, Joseph; Englander, Irvin S.; and Williams, James E., 4,117,482, Cl. 343-7.300.

English Clays Lovering Pochin & Company Limited: *See—*
Clark, Norman Owen; and Watson, James Henry Peter, 4,116,829, Cl. 210-42.00S.
Keat, Gordon Samuel, 4,116,831, Cl. 210-68.000.

Enoguchi, Yuji: *See—*
Tanaka, Susumu; Ogawa, Masaya; Kawabata, Hidetoshi; Fujiwara, Takao; Kurita, Takaji; Enoguchi, Yuji; Wada, Kenichi; and Murasaki, Hiroshi, 4,116,556, Cl. 355-3.0SH.

Enomoto, Hiroshi: *See—*
Murai, Hiromu; Fujita, Yukio; Mori, Tamiki; Enomoto, Hiroshi; and Yoshikuni, Yoshiaki, 4,117,159, Cl. 424-309.000.

Epifanova, Vera Ivanovna: *See—*
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.

Eppes, William R.: *See—*
Adrion, Robert F.; Buck, Robert T.; and Eppes, William R., 4,117,338, Cl. 250-461.00R.

Erbacher, John K.: *See—*
Nardi, John C.; Hussey, Charles L.; Erbacher, John K.; King, Lowell A.; and Fannin, Armand A., Jr., 4,117,207, Cl. 429-103.000.

Erickson, Robert E.; and Krajewski, Richard M., to Dow Chemical

Company, The. Absorbent films and laminates. 4,117,184, Cl. 428-224.000.
Ericsson, Jan-Eje, to Umea Mekaniska AB. Tree felling unit. 4,116,250, Cl. 144-34.00R.
Ernst Grob: *See*—
Krapfenbauer, Hans; and Grob, Ernst, 4,116,032, Cl. 72-68.000.
Ernst Leitz Wetzlar GmbH: *See*—
Holle, Werner; and Bletz, Walter, 4,117,325, Cl. 250-209.000.
Ervine, Albert W. G., to Remington Arms Company, Inc. Ammunition loading machine. 4,116,109, Cl. 86-23.000.
Erwin Sick Gesellschaft mit beschrankter Haftung Optik-Elektronik: *See*—
Francke, Erwin, 4,117,324, Cl. 250-202.000.
Sick, Erwin, 4,116,527, Cl. 350-6.700.
Sick, Erwin, 4,116,566, Cl. 356-200.000.
Erwin, Wayne F., to Koppers Company, Inc. Apparatus for texturizing a material. 4,116,248, Cl. 144-2.00R.
Escher Wyss GmbH: *See*—
Lehmann, Rolf; and Christ, Alfred, 4,116,601, Cl. 425-324.100.
Stotz, Wolf-Gunter; and Holik, Herbert, 4,116,763, Cl. 162-301.000.
Eslick, Robert: *See*—
Goering, Kenneth J.; and Eslick, Robert, 4,116,770, Cl. 195-63.000.
ESPE Fabrik Pharmazeutischer Praparate GmbH: *See*—
Schmitt, Werner; Purrmann, Robert; and Jochum, Peter, 4,116,788, Cl. 204-159.230.
Essex Group, Inc.: *See*—
Furtah, Reginald D.; and Gardocki, Gilbert J., 4,116,389, Cl. 239-585.000.
Vogel, Ralph A.; and Kittsmiller, Robert K., 4,116,422, Cl. 266-104.000.
Essilor International (Compagnie Generale d'Optique): *See*—
Wippler, Constant, 4,116,862, Cl. 252-300.000.
Etablissements Maillefer SA: *See*—
Swarbrick, Peter; Green, William John; and Maillefer, Charles, 4,117,195, Cl. 428-379.000.
Esterowitz, Leon: *See*—
Kruer, Melvin R.; Esterowitz, Leon; Bartoli, Filbert J.; and Allen, Roger E., 4,117,329, Cl. 250-338.000.
Etablissement Gelan: *See*—
Fross, Arthur E., 4,116,639, Cl. 422-111.000.
Ethyl Corporation: *See*—
Hornbaker, Edwin D.; Jones, Jesse D.; Kucsma, Michael E.; and Allen, Thomas S., 4,116,922, Cl. 260-40.00R.
Huang, Yun-Yang, 4,116,996, Cl. 260-449.60M.
Malec, Robert E., 4,117,011, Cl. 260-570.50P.
Eto, Goro: *See*—
Ono, Yutaka; Fujii, Yoichi; Yokoyama, Koji; and Igarashi, Toshifumi, 4,117,399, Cl. 324-96.000.
European Atomic Energy Community (Euratom): *See*—
Farfaletti-Casali, Falviano; Peter, Friedrich G.; and Gritzmann, Peter G., 4,116,264, Cl. 165-47.000.
Evans, E. Robert: *See*—
Bluestein, Ben Alfred; and Evans, E. Robert, 4,116,993, Cl. 260-448.20E.
Evans, Ralph S. Multi-position focusing apparatus. 4,116,539, Cl. 350-292.000.
Evans, Willie V., to ACF Industries, Incorporated. Rotatable visual indicator for safety systems. 4,116,157, Cl. 116-125.000.
Evert, Donald A.; and Nies, Charles W., deceased (by Nies, Carolyn J., executrix), to Honeywell Inc. Dual reel hub. 4,116,401, Cl. 242-68.300.
EVG Entwicklungs-u. Verwertungs- GmbH: *See*—
Ritter, Josef; Sackl, Alois; Ritter, Klaus; and Ritter, Gerhard, 4,116,244, Cl. 140-112.000.
Ewards, Gunnar, to AB Welin. Ship's embarkation device for E.G. pilots. 4,115,887, Cl. 9-1.600.
Ewen, Sol J. Ultrasonic oxygenation instrument. 4,116,239, Cl. 128-184.000.
Ewert, Russ J., to Canadian Foremost Ltd. Outrigger. 4,116,467, Cl. 280-764.000.
Exxon Production Research Company: *See*—
Butler, Roger Moore; Bombardieri, Caurino Cesar; and Slevinsky, Bruce Alexander, 4,116,275, Cl. 166-303.000.
Stone, Jacob E., 4,116,300, Cl. 181-114.000.
Exxon Research & Engineering Co.: *See*—
Bellows, Richard James, 4,117,079, Cl. 423-223.000.
Brois, Stanley J.; Gutierrez, Antonio; and Winans, Esther D., 4,116,876, Cl. 252-49.600.
Maas, Edward T., Jr., 4,117,083, Cl. 423-253.000.
Maas, Edward T., Jr., 4,117,084, Cl. 423-253.000.
O'Farrell, Charles P.; Malloy, Paul L.; and Thompson, Francis M., 4,117,186, Cl. 428-265.000.
Outten, Edward Francis; Ryer, Jack; and Williams, John E., 4,116,877, Cl. 252-72.000.
Rosensweig, Ronald E., 4,115,927, Cl. 34-1.000.
Ryer, Jack; Brois, Stanley J.; and Winans, Esther D., 4,116,643, Cl. 44-63.000.
Tsien, Hsue C.; and Venero, Agustin F., 4,117,065, Cl. 264-105.000.
Vannice, M. Albert; and Garten, Robert L., 4,116,994, Cl. 260-449.00R.
Whitney, Thomas A.; and Klemann, Lawrence P., 4,117,213, Cl. 429-194.000.
Ezura, Sakae: *See*—
Hayakawa, Hiroshi; and Ezura, Sakae, 4,116,255, Cl. 152-352.00R.
Fabian, Wolfgang; Kopineck, Hermann-Josef; and Tappe, Wilhelm, to Hoesch Werke AG. Device for measuring the flatness of metal strips. 4,116,029, Cl. 72-34.000.
Fabry, Lloyd W.; and Brame, Thomas Vinton, to Aeroflash Signal Corporation. Strobe light system for school buses. 4,117,454, Cl. 340-81.00F.
Fahrni, Peter: *See*—
Torelli, Aldo; and Prinz, Erwin, 4,116,163, Cl. 118-303.000.
Fair, Delbert W., to Continental Oil Company. Rotary air modulator. 4,116,301, Cl. 181-119.000.
Fairchild Camera and Instrument Corporation: *See*—
Krupp, David M.; and Hood, Robert B., 4,116,169, Cl. 123-32.0EC.
Fairey Winches Limited: *See*—
Quilliam, Douglas John, 4,116,320, Cl. 192-89.00A.
Falk, Richard A. Molten metal sampler with refractory mold halves. 4,116,070, Cl. 73-425.40R.
Fancher, Llewellyn W.; and Robbins, Jeffrey D., to Stauffer Chemical Company. Process for the manufacture of N-(beta-diorganodithiophosphorylethyl) aryl and alkyl sulfonamides. 4,117,043, Cl. 260-938.000.
Fang, James Chen-Shang, to Du Pont de Nemours, E. I., and Company. Phosphonated fluorotelomers. 4,116,890, Cl. 521-28.000.
Fannin, Armand A., Jr.: *See*—
Nardi, John C.; Hussey, Charles L.; Erbacher, John K.; King, Lowell A.; and Fannin, Armand A., Jr., 4,117,207, Cl. 429-103.000.
Fansteel Inc.: *See*—
Keifert, Hibbard G., 4,117,201, Cl. 428-591.000.
Fanta, George F.; and Doane, William M., to United States of America, Agriculture. Increasing absorbency of polymeric compositions by curing. 4,116,899, Cl. 260-17.4GC.
Farfaletti-Casali, Falviano; Peter, Friedrich G.; and Gritzmann, Peter G., to European Atomic Energy Community (Euratom). Nuclear reactors. 4,116,264, Cl. 165-47.000.
Farge, Daniel; Leboul, Jean; Le Goff, Yves; and Poiget, Gilbert, to Philagro. Herbicidal and phytohormonal amidoximes. 4,116,974, Cl. 260-332.20A.
Farrow, Harold Frederick; and Rackstraw, Bernard Booth, to Encoline (Process) Limited. Two-sided simultaneous printing method. 4,116,124, Cl. 101-170.000.
Fats and Proteins Research Foundation, Inc.: *See*—
Deno, Norman C., 4,116,987, Cl. 260-410.90R.
Feaster, Donavon L., to Sonitronic, Inc. Miniature switches. 4,117,280, Cl. 200-6.00B.
Fechner, Joachim; Fiebig, Siegward; Fischer, Friedrich; Fischer, Herbert; Hellmer, Lars; Riedel, Konrad; Stauffer, Adolf; and Sud, Kuldip, to Davy Powergas GmbH. Process for reduction of SO_2. 4,117,101, Cl. 423-569.000.
Feed Recycling Co.: *See*—
Senior, Franklin C., 4,117,175, Cl. 426-657.000.
Feeney, John J. Stabilized pylon and model aircraft system. 4,116,432, Cl. 272-31.00A.
Feenstra, Robijn, to Shell Oil Company. Rotary bit with ridges. 4,116,289, Cl. 175-329.000.
Felber, Wilfried: *See*—
Ackermann, Rolf; Felber, Wilfried; and Morlock, Gerhard, 4,117,238, Cl. 560-217.000.
Feldman, Harold, to Dynascan Corporation. Circuit for testing transistors or the like. 4,117,400, Cl. 324-158.00T.
Feldstein, George: *See*—
Smith, Robert E.; Chytil, Frank S.; Feldstein, George; and Swartz, Dorman J., 4,116,394, Cl. 242-25.00R.
Felton, John Robert; and Gutow, Russell S., Jr., to Varian Associates, Inc. Circuit for linearizing the response of an electron capture detector. 4,117,332, Cl. 250-374.000.
Ferrero Nahrungs-und Genussmittel GmbH: *See*—
Allasia, Alberto, 4,116,350, Cl. 215-31.000.
Fiat-Allis Construction Machinery, Inc.: *See*—
Koch, George Paul, 4,116,214, Cl. 137-522.000.
Fiebig, Siegward: *See*—
Fechner, Joachim; Fiebig, Siegward; Fischer, Friedrich; Fischer, Herbert; Hellmer, Lars; Riedel, Konrad; Stauffer, Adolf; and Sud, Kuldip, 4,117,101, Cl. 423-569.000.
Fields, Joseph E.; and Johnson, John H., to Monsanto Company. Method for lowering blood cholesterol level. 4,117,111, Cl. 424-78.000.
Figaro Giken Co., Ltd.: *See*—
Matsuyama, Akira, 4,117,082, Cl. 423-247.000.
Fike, Louis T.; and Green, Kenneth A., to Ohio Machine Company, Inc. Tire mold apparatus. 4,116,595, Cl. 425-17.000.
Filin, Nikolai Prokopievich: *See*—
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.
Fine-Line, Inc.: *See*—
Topel, Kenneth D., 4,116,194, Cl. 124-87.000.

Finkelstein, Manuel: *See—*
Ross, Sidney D.; Dunkl, Franz S.; and Finkelstein, Manuel, 4,117,531, Cl. 361-433.000.
Finlayson, Claude Malcolm, to N L Industries, Inc. Organophilic clay gellant. 4,116,866, Cl. 252-316.000.
Firestone Tire & Rubber Company, The: *See—*
Cheng, Tai Chun, 4,116,785, Cl. 204-159.140.
Firth, Francis G., to Applied Plastics Co., Inc. Method of packaging mutually reactive substances. 4,116,742, Cl. 156-289.000.
Fischer, Friedrich: *See—*
Fechner, Joachim; Fiebig, Siegward; Fischer, Friedrich; Fischer, Herbert; Hellmer, Lars; Riedel, Konrad; Stauffer, Adolf; and Sud, Kuldip, 4,117,101, Cl. 423-569.000.
Fischer, Hanspeter, to Ciba-Geigy Corporation. Pyridinium-s-triazines for regulating plant growth. 4,116,675, Cl. 71-93.000.
Fischer, Herbert: *See—*
Fechner, Joachim; Fiebig, Siegward; Fischer, Friedrich; Fischer, Herbert; Hellmer, Lars; Riedel, Konrad; Stauffer, Adolf; and Sud, Kuldip, 4,117,101, Cl. 423-569.000.
Fischer, Manfred: *See—*
Macenka, Johannes; Fischer, Manfred; and Gohlke, Fritz Joachim, 4,117,031, Cl. 260-838.000.
Fischer & Porter Co.: *See—*
Herzl, Peter J.; and Strohmeier, Warren, 4,116,058, Cl. 73-194.0VS.
Herzl, Peter J., 4,116,059, Cl. 73-194.0VS.
Roop, Robert; and Shine, Carl, 4,116,016, Cl. 62-52.000.
Fischer, Roman, to BASF Aktiengesellschaft. Manufacture of amidosulfonic acids. 4,117,004, Cl. 260-513.600.
Fisher, Charles B.: *See—*
Fisher, Sidney T.; and Fisher, Charles B., 4,116,273, Cl. 166-248.000.
Fisher, Frederick H.; and Anderson, Victor C., to United States of America, Navy. Elastic electrically-conductive strain cable. 4,116,153, Cl. 114-244.000.
Fisher, Sidney T.; and Fisher, Charles B. Induction heating of coal in situ. 4,116,273, Cl. 166-248.000.
Fisher, Zdenek: *See—*
Barber, Antony Dobson; and Fisher, Zdenek, 4,116,409, Cl. 248-2.000.
Fishman, Avraham. Spoon-shaped spring scale. 4,116,290, Cl. 177-149.000.
Fizichesky Institut Imeni P.N. Lebedeva Akademii Nauk SSSR: *See—*
Alexandrov, Vladimir Ilich; Osiko, Vyacheslav Vasilievich; Tatarintsev, Vladimir Mikhailovich; and Udovenchik, Viktor Timofeevich, 4,116,598, Cl. 425-174.80R.
Flanagan, Kirby E. L., to McCord Corporation. Impact energy-absorbing urethane foam. 4,116,893, Cl. 521-137.000.
Flannery, James E.: *See—*
Boyd, David C.; Flannery, James E.; Morgan, David W.; Rosplock, Sara E.; and Sczerbaniewicz, Stella A., 4,116,704, Cl. 106-54.000.
Fleischer, Helmut, to Robert Bosch GmbH. Temperature independent trigger pulse analysis circuit. 4,117,355, Cl. 307-310.000.
Flesch, Udo: *See—*
Schoknecht, Gunter; and Flesch, Udo, 4,116,040, Cl. 73-1.00R.
Flick, Carl, to Westinghouse Electric Corp. Combined electrical and coolant distribution system for dynamoelectric machines having internally cooled stator windings. 4,117,358, Cl. 310-59.000.
Flint, Orin Q. Key settable, pick proof lock. 4,116,026, Cl. 70-383.000.
Florian, Rudolf, to Dorentruper Sand- und Thonwerker G.m.b.H. Method and arrangement for use in lining articles, particularly melting oven. 4,117,052, Cl. 264-30.000.
Floryan, Daniel Edwin: *See—*
Cooper, Glenn Dale; and Floryan, Daniel Edwin, 4,116,939, Cl. 528-215.000.
Fluck, Jakob, to Rieter Machine Works, Ltd. Yarn traversing apparatus. 4,116,396, Cl. 242-43.00R.
Fluorocarbon Company, The: *See—*
Laurizio, Daniel V., 4,116,499, Cl. 308-3.00R.
FMC Corporation: *See—*
Garrett, Michael R., 4,116,044, Cl. 73-40.50R.
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Folland Enertec Ltd.: *See—*
Folland, Roy E.; and Millar, Richard C., 4,117,550, Cl. 366-136.000.
Folland, Roy E.; and Millar, Richard C., to Folland Enertec Ltd. Emulsifying system. 4,117,550, Cl. 366-136.000.
Forbes, Gerald. Thought dynamics game. 4,116,445, Cl. 273-161.000.
Ford, James A., to Kirsch Company. Double drapery carrier. 4,115,899, Cl. 16-87.40R.
Ford, Michael J.; and Gardner, Prescott Elliott, to Canadian International Paper Co. Method of producing high yield chemimechanical pulps. 4,116,758, Cl. 162-28.000.
Ford Motor Company: *See—*
Ludwig, Frank A., 4,117,208, Cl. 429-104.000.
Foreman, Luther M.; Heck, Samuel C.; and Wall, Bill R., to National Electric Corporation. Power regulator. 4,117,445, Cl. 338-198.000.
Formica Corporation: *See—*
Power, George Edward; and Bolling, Donald Louis, 4,117,198, Cl. 428-452.000.
Forney, Richard Davidson; Hernandez, Richard Samuel; and Curless, Richard Anderson, to Cincinnati Milacron Inc. Constant fluid level control for machine reservoir. 4,116,586, Cl. 417-41.000.
Forrester, Edward H.: *See—*
Douglas, Robert H.; Forrester, Edward H.; and Murray, David, 4,117,459, Cl. 340-147.00R.
Forster, Friedrich M. O.; and Kalisch, Alfons, to Institut Dr. Friedrich Forster, Prufgeratebau. Single magnetic stray field sensor whose signals are differently attenuated in two channels and then compared. 4,117,403, Cl. 324-240.000.
Forster, Karl-Heinz; and Lein, Werner, to Veb Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. Control system for positioning units exhibiting dead time in their response to activating signals. 4,116,125, Cl. 101-212.000.
Foster, Clark Berg: *See—*
Chavarria, Robert James; and Foster, Clark Berg, 4,116,439, Cl. 273-59.00A.
Foster, Howard E. Well drilling assembly and method. 4,116,287, Cl. 175-65.000.
Foster, James M.: *See—*
Coberly, Charles W.; and Lewis, Howard A., 4,116,523, Cl. 339-108.0TP.
Foster, Robert Dean; Maliszewski, Thomas Arthur; Sims, Joseph Alton, Jr.; and Taylor, Glenn Alfred, to Union Carbide Corporation. Continuous process for producing alkylene glycols from alkylene carbonates. 4,117,250, Cl. 568-858.000.
Foster Wheeler Energy Corporation: *See—*
Gorzegno, Walter P.; and Garcia-Mallol, Juan Antonio, 4,116,168, Cl. 122-406.00S.
Trozzi, Norman Kenneth, 4,116,388, Cl. 239-406.000.
Fox, Roland Thomas Victor: *See—*
Shephard, Margaret Claire; and Fox, Roland Thomas Victor, 4,117,147, Cl. 424-274.000.
Fozzard, George B., to Phillips Petroleum Company. Pyrolysis of heavies formed in production of unsaturated dinitriles. 4,117,001, Cl. 260-465.80R.
Fozzard, George B., to Phillips Petroleum Company. Suppression of side reactions in catalytic hydrogenation of diesters. 4,117,242, Cl. 560-263.000.
Francke, Erwin, to Erwin Sick Gesellschaft mit beschrankter Haftung Optik-Elektronik. Curve follower device. 4,117,324, Cl. 250-202.000.
Franco, Harold D., to GTE Automatic Electric Laboratories Incorporated. Chassis formed of sheet stock. 4,116,510, Cl. 312-257.0SK.
Francoeur, Raynald: *See—*
Perrault, Guy; Francoeur, Raynald; and Lavertu, Roger, 4,116,734, Cl. 149-19.200.
Franke, Kurt, to Siemens Aktiengesellschaft. X-ray diagnostic generator for the purpose of fluoroscopy and photography. 4,117,335, Cl. 250-402.000.
Frankenfeld, Klaus: *See—*
Beltz, Klaus; and Frankenfeld, Klaus, 4,117,092, Cl. 423-321.00S.
Franz, John E.: *See—*
Brannigan, Lawrence H.; Franz, John E.; and Howe, Robert K., 4,116,673, Cl. 71-92.000.
Franzen, Raymond E., to Medalie Manufacturing Co. Beverage dispenser. 4,116,246, Cl. 141-362.000.
Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, to Gulf Research & Development Company. Hydrodesulfurization process employing a promoted catalyst. 4,116,817, Cl. 208-210.000.
Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, to Gulf Research & Development Company. Multi-reactor hydrodesulfurization process. 4,116,818, Cl. 208-210.000.
Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, to Gulf Research & Development Company. Hydrodesulfurization process including product recycle. 4,116,819, Cl. 208-216.000.
Frazita, Richard F., to Hazeltine Corporation. Antenna coupling network with element pattern shift. 4,117,494, Cl. 343-844.000.
Frechet, Daniel: *See—*
Nedelec, Lucien; Frechet, Daniel; and Dumont, Claude, 4,117,164, Cl. 424-330.000.
Frederick, Gary L., to Garrett Corporation, The. Mass flow sensor and method. 4,116,060, Cl. 73-194.0VS.
Freedman, Jules, to Richardson-Merrell Inc. 11-Aminoalkylmorphanthridin-11-ols. 4,117,122, Cl. 424-244.000.
Freeman, Peter Frank Hilary: *See—*
Barlow, Charles Brian; and Freeman, Peter Frank Hilary, 4,117,167, Cl. 424-330.000.
Freer, William Gordon; Pincherle, Hugh Andrew; and Moore, William Thomas, to Rank Organisation Limited, The. Liquid crystal displays. 4,117,472, Cl. 340-324.00M.
French, Harlan S., to American Can Company. Safety door edge. 4,115,952, Cl. 49-26.000.
French Oil Mill Machinery Company, The: *See—*
Craig, Gregory C., 4,117,548, Cl. 366-83.000.
Frentzel, Kurt Heinz, to Hunter Douglas International N.V. Support device for vertical slats of a slatted blind. 4,115,898, Cl. 16-87.00R.
Frenz, Norbert W., Jr.: *See—*
Mead, Ralph T.; Rudolph, Frank W.; Frenz, Norbert W., Jr.; and Greatbatch, Wilson, 4,117,212, Cl. 429-153.000.
Frey, Jeffrey: *See—*
Kamei, Kiyoo; Ikoma, Toshiaki; Tokuda, Hirokuni; and Frey, Jeffrey, 4,116,722, Cl. 148-1.500.
Fridinger, Tomas L.; Moore, George G. I.; and Lappi, Larry R., to Minnesota Mining and Manufacturing Company. 4-Methylthio-2-trifluoromethylmethane-sulfonanilide and derivatives thereof. 4,116,676, Cl. 71-103.000.
Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Hirschfeld, Dieter; and Muller, Manfred, 4,116,724, Cl. 148-3.000.
Friedrich, Ralph E.: *See—*
Garrett, Walter L.; Friedrich, Ralph E.; and Czerepinski, Ralph G., 4,116,896, Cl. 260-17.00R.

Fross, Arthur E., to Etablissement Gelan. Method and apparatus for the production of carbon black from liquid or gaseous hydrocarbons. 4,116,639, Cl. 422-111.000.
Frush, John P.: *See—*
Sporri, Max, 4,115,889, Cl. 15-21.00R.
Fuchs, Lothar U. Fastening. 4,116,573, Cl. 403-264.000.
Fuhr, Arlan W.; and Lee, Warren C. Chiropractic adjusting instrument. 4,116,235, Cl. 128-69.000.
Fuji Chemical Industry Company Limited: *See—*
Kameyama, Tsutomu; Yoshina, Shigetaka, deceased; and Yoshina, Yoshina, heir at law, 4,116,972, Cl. 260-326.100.
Fuji Photo Film Co., Ltd.: *See—*
Akashi, Goro; Suzuki, Osamu; and Fujiyama, Masaaki, 4,117,190, Cl. 428-325.000.
Kondo, Toshihiro, 4,117,500, Cl. 354-23.00D.
Miyahara, Junji; and Kato, Hisatoyo, 4,116,911, Cl. 260-28.50A.
Mori, Teruo; and Ohashi, Azusa, 4,116,695, Cl. 96-86.00P.
Moriya, Ikuro; and Tsuruta, Masao, 4,115,913, Cl. 29-450.000.
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Fuji Xerox Co., Ltd.: *See—*
Shintani, Takamasa; and Nagasawa, Koyo, 4,117,517, Cl. 358-260.000.
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Fujii, Yoichi: *See—*
Ono, Yutaka; Fujii, Yoichi; Yokoyama, Koji; and Igarashi, Toshifumi, 4,117,399, Cl. 324-96.000.
Fujiki, Norio, to Nissan Motor Company, Limited. Noise-immune signal processing circuit for pulsed radars. 4,117,483, Cl. 343-8.000.
Fujimori, Ryo: *See—*
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Fujita, Yoshishige; Asagao, Soichi; and Ogura, Motoshige, to Central Glass Company, Limited. Process for preparing sodium ammonium hydrogen-phosphate and ammonium chloride from wet process phosphoric acid. 4,117,089, Cl. 423-306.000.
Fujita, Yukio: *See—*
Murai, Hiromu; Fujita, Yukio; Mori, Tamiki; Enomoto, Hiroshi; and Yoshikuni, Yoshiaki, 4,117,159, Cl. 424-309.000.
Fujiwara, Takao: *See—*
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Fukai, Kiyoshi: *See—*
Matsumoto, Seiji; and Fukai, Kiyoshi, 4,116,752, Cl. 156-624.000.
Fukao, Isao; and Monma, Kimio, to Nihon Seimitsu Keisoku. Non-destructive insulation test apparatus. 4,117,397, Cl. 324-54.000.
Fukuda, Kenji: *See—*
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Fukui, Kiyozumi, to Teijin Seiki Company Limitejd. Driving mechanism. 4,116,293, Cl. 180-43.00B.
Fukuura, Yukio: *See—*
Honda, Toshio; Tanuma, Itsuo; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; and Suzuki, Yoshikatsu, 4,117,036, Cl. 260-878.00R.
Furtah, Reginald D.; and Gardocki, Gilbert J., to Essex Group, Inc. Electromagnetic fuel injection valve. 4,116,389, Cl. 239-585.000.
Furuno Electric Co., Ltd.: *See—*
Minohara, Kiyomi; and Sugiyama, Akira, 4,117,487, Cl. 343-100.0SA.
Futhey, John A. Individualized teaching system utilizing electrical continuity. 4,115,931, Cl. 35-9.00C.
G.D. Searle & Co.: *See—*
Adelstein, Gilbert W., 4,116,963, Cl. 260-293.690.
Hill, John B., 4,117,225, Cl. 542-425.000.
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GAF Corporation: *See—*
Barabas, Eugene S., 4,116,913, Cl. 260-29.60E.
Brachman, Armand E.; Khattab, Ghazi; and Smolin, Edwin M., 4,116,925, Cl. 260-42.180.
Prater, J. Lewis; and Hedworth, Robert L., 4,117,248, Cl. 568-855.000.
Schneider, Louis; and Graham, David E., 4,117,006, Cl. 260-544.00D.
Schneider, Louis; and Graham, David E., 4,117,009, Cl. 260-553.00E.
Schneider, Louis; and Graham, David E., 4,117,162, Cl. 424-320.000.
Schneider, Louis; and Graham, David E., 4,117,163, Cl. 424-320.000.
Gale, David Mark, to Du Pont de Nemours, E. I., and Company. Polyoxymethylene/copolyether-ester blends. 4,117,033, Cl. 260-860.000.
Gallo-Torres, Hugo; Hamilton, James Guthrie; and Sullivan, Ann Clare, to Hoffmann-La Roche Inc. Method of increasing bile flow and decreasing lipid levels. 4,117,121, Cl. 424-238.000.
Galperin, Boris Grigorievich: *See—*
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Galvin, Aaron A.; Shapiro, L. Dennis; and Skov, Valdemar, to American District Telegraph Company. Multi-mode intrusion alarm system. 4,117,479, Cl. 340-502.000.
Gancy, Alan Brian; and Durling, Robert Edward, to Allied Chemical Corporation. Corrosion inhibition of stainless steel exposed to hot carbonates. 4,116,629, Cl. 422-13.000.
Gannet Holdings Limited: *See—*
Maclaren, Owen F., 4,116,465, Cl. 280-647.000.
Gansser, Robert E.: *See—*
Otrhalek, Joseph V.; Gomes, Gilbert S.; and Gansser, Robert E., 4,116,713, Cl. 134-3.000.
Ganssle, Eugene Robert; Scott, Ralph Richard; and Williams, Richard Jean, to RCA Corporation. Mounting structure. 4,116,263, Cl. 165-27.000.
Garbarini, Charles J., Jr.: *See—*
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Garcia-Mallol, Juan Antonio: *See—*
Gorzegno, Walter P.; and Garcia-Mallol, Juan Antonio, 4,116,168, Cl. 122-406.00S.
Garden, Barrie Franklin. Safety container having vent means. 4,116,329, Cl. 206-1.500.
Gardiner, Frank J. Porous felt web conditioning system. 4,116,762, Cl. 162-199.000.
Gardner-Denver Company: *See—*
DePagter, Glenn H., 4,116,093, Cl. 81-57.390.
Gardner, Prescott Elliott: *See—*
Ford, Michael J.; and Gardner, Prescott Elliott, 4,116,758, Cl. 162-28.000.
Gardocki, Gilbert J.: *See—*
Furtah, Reginald D.; and Gardocki, Gilbert J., 4,116,389, Cl. 239-585.000.
Garello, David J., to Northwestern Equipment and Supply Co. Cylinder carrying strap. 4,116,374, Cl. 224-55.000.
Garner, Herman H., to Vortox Company. Air cleaner. 4,116,647, Cl. 55-223.000.
Garnett-Bywater Limited: *See—*
Barber, Norman B., 4,115,903, Cl. 19-99.000.
Garofano, Norman R.; and Bitney, Ronald G., to Allied Chemical Corporation. Solar evaporation of alkaline trona-process waste pond liquors with acid black 2 and acid green 1. 4,116,757, Cl. 159-47.0WL.
Garrett Corporation, The: *See—*
Frederick, Gary L., 4,116,060, Cl. 73-194.0VS.
Garrett, David W.: *See—*
Charter, Kenneth F.; Miller, John R.; and Garrett, David W., 4,117,067, Cl. 264-119.000.
Garrett, Michael R., to FMC Corporation. Packoff leak detector. 4,116,044, Cl. 73-40.50R.
Garrett, Thomas B.: *See—*
Dieck, Ronald L.; Garrett, Thomas B.; and Magnusson, Alan B., 4,116,891, Cl. 521-89.000.
Garrett, Walter L.; Friedrich, Ralph E.; and Czerepinski, Ralph G., to Dow Chemical Company, The. Fountain compositions for use in lithographic printing comprising aqueous solutions of polyacrylamide based polymers and blends of polyacrylamide and polyacrylic acid with an organic chelating agent. 4,116,896, Cl. 260-17.00R.
Garten, Robert L.: *See—*
Vannice, M. Albert; and Garten, Robert L., 4,116,994, Cl. 260-449.00R.
Gatechair, Leslie, to DeSoto, Inc. Curable aqueous emulsions containing ethylenically unsaturated tertiary amines. 4,116,787, Cl. 204-159.230.
Gates, Allen Peter; and Saunderson, Allan, to Vickers Limited. Light sensitive materials. 4,117,039, Cl. 260-875.000.
Gates Rubber Company, The: *See—*
Sjogren, Axel O., 4,117,203, Cl. 429-7.000.
Gattner, Hans; and Ribka, Joachim, to Cassella Farbwerke Mainkur Aktiengesellschaft. Melamine resin and dye mixtures. 4,116,918, Cl. 260-37.00P.
Gattner, Hans; Spietschka, Ernst; and Troster, Helmut, to Hoechst Aktiengesellschaft. Dyed polyesters, process for their preparation and their use for the dyeing of plastics. 4,116,923, Cl. 528-220.000.
Gau, Wolfgang: *See—*
Schiweck, Hubert; Steinle, Georg; Muller, Lutz; Gau, Wolfgang; and Munir, Mohammad, 4,117,173, Cl. 426-548.000.
Gaughan, Edmund J.; and Large, George B., to Stauffer Chemical Company. N-carbamoyl ethyl oxanilates. 4,116,668, Cl. 71-88.000.
Gautier, Charles L.; DeLuca, Paul V.; and Atun, Albert, to Porta Systems Corp. Single sided protector frame for telephone circuits. 4,117,273, Cl. 179-98.000.
Gawryk, William C., Sr., to Newcomer Products, Inc. Cutting insert. 4,116,576, Cl. 407-114.000.
Geary, William R. C. Hydraulic pulse generating apparatus. 4,116,004, Cl. 60-543.000.
Gebauer, Bodo G., to GTE Automatic Electric Laboratories Incorporated. Reed switch. 4,117,291, Cl. 200-268.000.

Gebr. Hofmann, G.m.b.H. & Co., Maschinenfabrik: *See*—
Kogler, Horst; Honlinger, Herwig; Himmler, Gunther; and Knoll, Gunter, 4,116,055, Cl. 73-146.000.

Gebrueder Heller Maschinenfabrik GmbH: *See*—
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Geer, Ernest C.: *See*—
Cook, Harold L., Jr.; Geer, Ernest C.; and Katz, Donald L., 4,116,276, Cl. 166-314.000.

Geewala, Tushar Ramesh, to International Business Machines Corporation. Two-part current injection interferometer amplifiers and logic circuits. 4,117,354, Cl. 307-306.000.

Gehrig, Robert G., to Eaton Corporation. Fluid supply for occupant restraint system. 4,116,466, Cl. 280-736.000.

Gelbein, Abraham P.; and Sze, Morgan C., to Lummus Company, The. Production of carboxylic acids from nitriles. 4,116,967, Cl. 260-295.50R.

Gelfand, Mikhail Lvovich; Goldshtein, Boris Grigorievich; Gornik, Leonid Avrumovich; Shishulin, Jury Pavlovich; Tsipenjuk, Yakov Isaakovich; and Tsygankov, Oleg Semenovich. Rotary tool for making holes. 4,116,578, Cl. 408-222.000.

Gell, Maurice L.; and Duhl, David N., to United Technologies Corporation. Heat treated superalloy single crystal article and process. 4,116,723, Cl. 148-3.000.

General Atomic Company: *See*—
Langley, John Randolph; and Spritzer, Michael H., 4,116,160, Cl. 118-48.000.

General Battery Corporation: *See*—
Windisch, Lawrence; Nees, John; and Channing, Harry M., 4,117,387, Cl. 320-2.000.

General Dynamics Corporation: *See*—
Kaarlela, William Thomas, 4,116,688, Cl. 75-229.000.
Kaarlela, William Thomas, 4,116,689, Cl. 75-229.000.
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General Electric Company: *See*—
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Baker, Fred E., 4,116,363, Cl. 220-448.000.
Becker, Joseph J.; Luborsky, Fred E.; Jacobs, Israel S.; and McCary, Richard O., 4,116,728, Cl. 148-108.000.
Bluestein, Ben Alfred; and Evans, E. Robert, 4,116,993, Cl. 260-448.20E.
Boerstler, Leslie H.; Discenza, Walter V., Jr.; Marvin, Mason D.; and Ebersole, Theodore J., 4,117,344, Cl. 290-52.000.
Boyd, John H., Jr.; and Nelson, Don C., Jr., 4,116,410, Cl. 248-26.000.
Butler, Walter J.; and Eichelberger, Charles W., 4,117,353, Cl. 307-297.000.
Cella, James A., 4,116,886, Cl. 528-88.000.
Cleveland, William K. S.; Webb, Jimmy L.; and Orlando, Charles M., 4,117,018, Cl. 568-726.000.
Cooper, Glenn Dale; and Floryan, Daniel Edwin, 4,116,939, Cl. 528-215.000.
Demarest, Donald Monroe; and Chandler, Edgar Frank, 4,117,527, Cl. 361-103.000.
Gilbert, Kendall E.; Johnson, Daniel; and Macier, Robert Raymond, 4,115,998, Cl. 60-39.09R.
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Godfrey, David E., 4,115,915, Cl. 29-596.000.
Jackson, Melvin R.; and Rairden, John R., III, 4,117,179, Cl. 427-405.000.
Koenig, Paul W., 4,117,508, Cl. 357-81.000.
Logan, James H., 4,117,434, Cl. 335-213.000.
Rabatin, Jacob G., 4,116,865, Cl. 252-301.40H.
Richter, Eike, 4,117,360, Cl. 310-183.000.
Staats, Peter Francis, 4,117,337, Cl. 250-445.00T.
Stein, Charles R., 4,116,543, Cl. 350-333.000.
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Willyoung, David M., 4,116,005, Cl. 60-655.000.
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Yang, Kei-Hsiung, 4,117,365, Cl. 313-101.000.

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General Equipment & Manufacturing Co., Inc.: *See*—
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General Motors Corporation: *See*—
Micheli, Adolph L., 4,117,058, Cl. 264-65.000.
Rhodes, James F., 4,116,883, Cl. 252-463.000.
Sand, Roger D., 4,116,175, Cl. 123-117.00R.

General Recycling Corporation: *See*—
Kennedy, Richard B., 4,116,760, Cl. 162-56.000.

Generini, Gianni, to Anic, S.p.A. Method for recovering variable-valency elements and purifying sewage waters. 4,116,783, Cl. 204-150.000.

Geo Space Corporation: *See*—
McNeel, William O., 4,117,449, Cl. 340-17.00R.

Georight Industries, Inc.: *See*—
Lubov, Donald S., 4,115,963, Cl. 52-81.000.

Gerij, Janusz: *See*—
Boy Marcotte, Jean-Louis; Chevalier, Georges; Gerij, Janusz; and Leheu, Jacques, 4,116,765, Cl. 176-38.000.

Gerlach, Richard K., to Rengel, Richard J. Hyperoptic translator system. 4,117,265, Cl. 179-1.0SP.

Gerlach-Werke GmbH: *See*—
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Gerrity, Albert B.: *See*—
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Gershanov, Felix Borisovich: *See*—
Abramov, Ivan Egorovich; Gershanov, Felix Borisovich; Dolidze, Vladimir Romanovich; Zakharova, Nina Vasilievna; Liakumovich, Alexandr Grigorievich; Michurov, Jury Ivanovich; Popov, Vasily Dmitrievich; Rutman, Grigory Iosifovich; and Shalimova, Zoya Stepanovna, 4,117,244, Cl. 568-799.000.

Geuss, Joseph A., to Amca International Corporation. Drop hammer frame weldment and assembly. 4,116,039, Cl. 72-455.000.

Geytenbeek, Johannes Jacobus Franciscus: *See*—
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Giebel, Wolfgang; Krause, Herbert; and Meltsch, Hans-Juergen, to Siemens Aktiengesellschaft. Cable sleeve. 4,117,259, Cl. 174-92.000.

Giessen, Bill C.: *See*—
Polk, Donald E.; and Giessen, Bill C., 4,116,682, Cl. 75-123.00H.

Gilbert, Kendall E.; Johnson, Daniel; and Macier, Robert Raymond, to General Electric Company. Combustion monitor. 4,115,998, Cl. 60-39.09R.

Gildemeister Corpoplast GmbH: *See*—
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Gillet, Philippe Jean; and Henrich, Gaston, to Societe Chimique des Charbonnages. Method of separation of catalytic residues derived from aluminum chloride. 4,117,023, Cl. 260-671.00R.

Gillette Company, The: *See*—
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Gimelfarb, Felix Aronovich: *See*—
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Giordano, Joseph A. Action toy and amusement device. 4,115,947, Cl. 46-116.000.

Giovachini, Jean-Luc; and Vendramini, Dante Marc, to Institute de Recherche des Transports; and Vendramini, Dante Marc. Composite wheel structure capable of withstanding large centrifugal forces. 4,116,088, Cl. 74-572.000.

Giovanelli, Armand: *See*—
Jaekle, William M.; Byrne, Robert; and Giovanelli, Armand, 4,116,135, Cl. 105-378.000.

Girardi, Joseph: *See*—
DeNigris, Ernest Gerard; Girardi, Joseph; and Ruehl, William Edwin, 4,116,524, Cl. 339-113.00R.

Girault, Pablo. Method of excavating tunnels. 4,116,011, Cl. 405-134.000.

Givaudan Corporation: *See*—
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Glanz, Kenneth D.; and McQuain, David B., to NCR Corporation. Thermal sensitive materials. 4,116,973, Cl. 260-326.11R.

Glascock, Homer H., Jr., to General Electric Company. Reflective coating for external core electrodeless fluorescent lamp. 4,117,378, Cl. 315-248.000.

Glaser, Marshall H.; and Jeakle, Patrick L., to Orsco, Inc. Direct connection co-axial fitting for injection lubricator. 4,116,475, Cl. 285-133.00R.

Glass, Alastair Malcolm: *See*—
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Glauert, Wolfram, to Robert Bosch GmbH. Position transducer, particularly to determine the instantaneous angular position of a rotating shaft, especially of an internal combustion engine. 4,117,401, Cl. 324-208.000.

Glazer, Vadim Moiseevich: *See*—
Belousov, Viktor Vasilievich; Glazer, Vadim Moiseevich; and Shestakov, Sergei Vasilievich, 4,116,778, Cl. 195-139.000.

Glenn, William E., to New York Institute of Technology. Method of forming an optical fiber device. 4,116,739, Cl. 156-169.000.

Globol Werk GmbH: *See*—
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Glowe, Donald E.: *See*—
Johnson, Ben C.; Thornton, J. Scott; Glowe, Donald E.; Cassidy, Patrick E.; and Anderson, Robert E., 4,117,312, Cl. 219-548.000.

Goble, William M., to Moore Products Co. Isolation circuit with duty cycle feedback. 4,117,411, Cl. 330-10.000.

Godar, Richard L.; and Corneli, Philip R., to Petrolite Corporation. Organo-sulfur compounds as high temperature antifoulants. 4,116,812, Cl. 208-48.0AA.

Godfrey, David E., to General Electric Company. Process for manufacturing motor having windings constructed for automated assembly. 4,115,915, Cl. 29-596.000.

Goel, Jitendra; Narayan, Subrahmanyam Yegna; and Drukier, Ira, to RCA Corporation. Method of making a submicrometer aperture in a substrate. 4,117,301, Cl. 219-121.0EM.

Goering, Kenneth J.; and Eslick, Robert, to Research Corporation.

Waxy barley starch with unique self-liquefying properties. 4,116,770, Cl. 195-63.000.
Goff, Clifford E.: *See—*
Bible, Harley V.; Goff, Clifford E.; and Moon, William T., Jr., 4,116,155, Cl. 116-65.000.
Gofflot, Armand. Automatic cattle gate assembly. 4,116,166, Cl. 119-99.000.
Gogins, Laird B., to Power-Matic Corporation. Variable speed transmission. 4,116,083, Cl. 74-393.000.
Gohlke, Fritz Joachim: *See—*
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Goltz, Wayne H.: *See—*
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Gomes, Gilbert S.: *See—*
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Goodman, Murray; Verlander, Michael S.; Kaplan, Nathan O.; and Venter, J. Craig, to Reagents of the University of California, The. Water-soluble, physiologically active, synthetic copolypeptides. 4,116,949, Cl. 260-112.50R.
Goodyear Tire & Rubber Company, The: *See—*
Kline, Richard H., 4,117,240, Cl. 560-221.000.
Goranson, Paul L.: *See—*
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Gorby, Jack: *See—*
Dutton, Edward E.; and Gorby, Jack, 4,116,600, Cl. 425-296.000.
Gordon, Harry W., to Schmid Laboratories, Inc. Composition and method of treating benign prostatic hypertrophy with heptamycin. 4,117,114, Cl. 424-115.000.
Gorelick, Donald E. Blood pressure cuff automatic deflation device. 4,116,230, Cl. 128-2.05M.
Goret, Jean Louis Ernest Raymond: *See—*
DeConinck, Wilfried Rene'; and Goret, Jean Louis Ernest Raymond, 4,117,420, Cl. 331-17.000.
Gorman, Joseph G.; Roach, James F.; and Wayland, Paul O., to Westinghouse Electric Corp. Vacuum type circuit interrupter with a contact having integral axial magnetic field means. 4,117,288, Cl. 200-144.00R.
Gornik, Leonid Avrumovich: *See—*
Gelfand, Mikhail Lvovich; Goldshtein, Boris Grigorievich; Gornik, Leonid Avrumovich; Shishulin, Jury Pavlovich; Tsipenjuk, Yakov Isaakovich; and Tsygankov, Oleg Semenovich, 4,116,578, Cl. 408-222.000.
Gorondy, Emery John: *See—*
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Gorr, Benjamin B.; and Mack, Richard B., to United States of America, Air Force. Radar target cross section conirol method and means. 4,117,485, Cl. 343-18.00E.
Gorzegno, Walter P.; and Garcia-Mallol, Juan Antonio, to Foster Wheeler Energy Corporation. Vapor generating system utilizing integral separators and angularly arranged furnance boundary wall fluid flow tubes. 4,116,168, Cl. 122-406.00S.
Gosger, Peter; Pott, Paul Gerhard; and Wolter, Bernd, to AEG-Elotherm. G.m.b.H. Machine for the simultaneous electrochemical processing of multiple workpieces. 4,116,799, Cl. 204-224.00M.
Goto, Eiichi; Souma, Takashi; Idesawa, Masanori; and Tanaka, Kazumitsu, to Kenkyusho, Rikagaku; and Nihon Denshi Kabushiki Kaisha. Electron beam exposure system. 4,117,340, Cl. 250-492.00A.
Gotoh, Hideo; Igarashi, Akira; Kobayashi, Reiko; and Akiho, Kiyotake, to Oji Paper Co., Ltd. Process for producing moisture and waterproof paper. 4,117,199, Cl. 428-486.000.
Gould Inc.: *See—*
Kussy, Frank W.; Elmore, Claudius C., Jr.; and Molesworth, Richard E., 4,117,290, Cl. 200-243.000.
Snyder, Daniel S.; Luzsicza, Steven O.; and Pauer, Lyle A., 4,117,452, Cl. 340-58.000.
Gould, Paul F.; and Pate, James O., to United States of America, Navy. Bouyant electrode with anti-birdnesting device. 4,117,447, Cl. 340-4.00E.
Gozlan, Roger: *See—*
Lavalley, Roger; Gozlan, Roger; and Brami, Gilbert, 4,117,450, Cl. 340-52.00H.
Grabbe, Dimitry G.; and Sweeney, Joseph Patrick, to AMP Incorporated. Electrical connections for chip carriers. 4,116,519, Cl. 339-17.0CF.
Grabowich, Paul: *See—*
Cimarusti, Christopher M.; Grabowich, Paul; and Varma, Ravi K., 4,116,978, Cl. 260-345.200.
Graham, David E.: *See—*
Schneider, Louis; and Graham, David E., 4,117,006, Cl. 260-544.00D.
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Schneider, Louis; and Graham, David E., 4,117,162, Cl. 424-320.000.
Schneider, Louis; and Graham, David E., 4,117,163, Cl. 424-320.000.
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Graham, Gordon Judson; Martin, John Frederick; and Crowell, Douglas Hodgen, to USM Corporation. Cutting machine incorporating means for transferring cut parts and scrap. 4,116,097, Cl. 83-155.000.
Graney, Francis X. Log splitter with gear rack drive. 4,116,251, Cl. 144-193.00R.
GRAPHA-Holding AG.: *See—*
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Greatbatch, Wilson: *See—*
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Greaves, Melvin J.; and Razgaitis, Frank V., to Arthur G. McKee & Company. Charging apparatus for shaft furnaces and method. 4,116,345, Cl. 214-37.000.
Green, Kenneth A.: *See—*
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Green, William John: *See—*
Swarbrick, Peter; Green, William John; and Maillefer, Charles, 4,117,195, Cl. 428-379.000.
Greenwood, John C., to International Standard Electric Corporation. Fiber optic switch arrangement. 4,116,531, Cl. 350-96.200.
Greer, Charles W. Shock actuated shut-off valve. 4,116,209, Cl. 137-38.000.
Greer, Raymond Thomas; Vale, Bradley Harold; and Martin, David Michael, to Iowa State University Research Foundation. Electron microscopes. 4,117,323, Cl. 250-311.000.
Gregoriadis, Gregory: *See—*
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Griffin, Wendell L., to GTE Sylvania Incorporated. Multiple layered connector. 4,116,516, Cl. 339-17.00F.
Griffith, James R.; and O'Rear, Jacques G., to United States of America, Navy. Electrical conducting phthalonitrile polymers. 4,116,945, Cl. 528-362.000.
Gritzmann, Peter G.: *See—*
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Gross, Friedrich; Binder, Peter; and Brehmer, Dieter, to WABCO Westinghouse GmbH. Bellows for sealing off the piston rod passage in an operating cylinder. 4,116,115, Cl. 92-168.000.
Gruenhagen, Henry William. Flush valve control assembly. 4,115,880, Cl. 4-325.000.
Grumman Aerospace Corporation: *See—*
Bacchi, Anthony C.; and Kress, Robert W., 4,116,405, Cl. 244-12.400.
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Gebauer, Bodo G., 4,117,291, Cl. 200-268.000.
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Hall, Harold H., Jr.; and Bouchard, Andre C., 4,116,616, Cl. 431-93.000.
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Gueguin, Michel, to Quebec Iron and Titanium Corporation. Titanium slag-coke granules suitable for fluid bed chlorination. 4,117,076, Cl. 423-78.000.
Guerber, Paul Leon, to Coyne & Bellier, Bureau d'ingenieurs Conseils. Process and apparatus for producing deep boreholes. 4,116,285, Cl. 175-7.000.

Guillaumin, Bruno: *See*—
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Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, 4,116,818, Cl. 208-210.000.
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Hupp, Stephen S.; Sabourin, Edward T.; Swift, Harold E.; and Vogel, Roger F., 4,117,021, Cl. 260-669.00A.
Kobylinski, Thaddeus P.; and Swift, Harold E., 4,116,995, Cl. 260-449.60M.
Gumbelevicius, John: *See*—
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Guschl, Randolph Joseph, to Du Pont de Nemours, E. I., and Company. Flame retardant polymeric compositions. 4,117,041, Cl. 260-927.00N.
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Haberle, Heinz; and Aubele, Richard, to International Standard Electric Corporation. System for two-way communication between a master station and a plurality of substations via a satellite. 4,117,267, Cl. 179-15.0BS.
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Hall, Floyd Van, to Liggett Group Inc. Apparatus for compacting multi-sectional particulate containing filters. 4,116,602, Cl. 425-354.000.
Hall, Harold H., Jr.; and Bouchard, Andre C., to GTE Sylvania Incorporated. Door-actuated activation means for flashlamp article. 4,116,615, Cl. 431-92.000.
Hall, Harold H., Jr.; and Bouchard, Andre C., to GTE Sylvania Incorporated. Flashlamp assembly utilizing disposable flashlamp article. 4,116,616, Cl. 431-93.000.
Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick Louis; and Vock, Manfred Hugo, to International Flavors & Fragrances Inc. 1-Acetyl-3-3-dimethyl-(2-propenyl)cyclohexane, process for producing same and organoleptic uses of same. 4,117,015, Cl. 260-586.00C.
Hall, John M. Liquid shoe innersole. 4,115,934, Cl. 36-44.000.
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Hamilton, Martin Norman. End mill tool holder body and tool. 4,116,579, Cl. 408-233.000.
Hamilton, Paul D. Hang glider having inflatable airfoil. 4,116,406, Cl. 244-16.000.
Hamilton, Ralph A. Methods and apparatus for heating a fluid by vapor condensation. 4,116,167, Cl. 122-33.000.
Hamisch, Paul H., Jr., to Monarch Marking Systems, Inc. Hand-held labeler. 4,116,746, Cl. 156-384.000.
Hamisch, Paul H., Jr., to Monarch Marking Systems, Inc. Hand-held labeler. 4,116,747, Cl. 156-384.000.
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Hampejs, Karel, to SIG Schweizerische Industrie-Gesellschaft. Fluidic amplifier. 4,116,112, Cl. 91-380.000.
Hampton, Robert S., Jr.; Morrison, Leonard A.; Murphy, John W.; and Mountz, Craig E., to Ammco Tools, Inc. Automotive toe-in gauge. 4,115,926, Cl. 33-288.000.
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Hanna, Kheder Abdul Karim; and Collins, Brian Stuart, to C & S Antennas Limited. Logarithmically periodic loop antenna array with spaced filters in the coupling network. 4,117,491, Cl. 343-742.000.
Hannah, James T. Concrete tanks with interlocking bottom. 4,117,071, Cl. 264-256.000.
Hannecart, Robert Stephan. Device for mixing gases and liquids. 4,117,047, Cl. 261-91.000.
Hansen, Karl A.; and Hendrickson, I. Glen, to Boeing Company, The. Flux concentrator for electromagnetic pulling. 4,116,031, Cl. 72-56.000.
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tones and 2-amino-phenyl nitromethylketones. 4,117,137, Cl. 424-263.000.
Harper, George Sullivan, to Airpax Electronics Incorporated. Snap action circuit breaker. 4,117,285, Cl. 200-76.000.
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Havas, Jeno; Doktor, Elek; Patko, Marton; and Pungor, Erno, to Radelkis Elektrokemiai Muszergyarto Szovetkezet. Selective halide and sulfide sensitive electrodes. 4,116,796, Cl. 204-195.00M.
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Hayashi, Yoshimasa; and Nakajima, Yasuo, to Nissan Motor Company, Limited. Dual spark plug ignition internal combustion engine having improved cylinder head configuration. 4,116,176, Cl. 123-119.00A.
Hayashi, Yoshimasa; and Nagumo, Shin-ichi, to Nissan Motor Company, Limited. Internal combustion engine with improved exhaust valve arrangement. 4,116,180, Cl. 123-119.00A.
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Head, Brian Arthur, to Whatman Reeve Angel Limited. Porous element and the preparation thereof. 4,116,761, Cl. 162-152.000.
Hebda, Thomas. Device for storing bicycles in a building. 4,116,341, Cl. 211-17.000.
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Hejkal, Charles S. Bowling ball and hardness measuring instrument holding device. 4,116,047, Cl. 73-81.000.
Heldmann, Ernest J.; and Capuano, Terry D., to Veeder Industries Inc. Shaft clamping device. 4,116,572, Cl. 403-7.000.
Hell, August; Kobusch, Wolfram; and Braun, Fritz, to AGFA-Gevaert, A.G. Apparatus for assembling and packing photographic prints with associated developed films. 4,115,981, Cl. 53-55.000.
Hellmer, Lars; Koller, Gerald; Al Muddarris, Ghazi Rashid; and Sud, Kuldip Kumar, to Davy Powergas GmbH. Process for reduction of sulfur dioxide to sulfur. 4,117,100, Cl. 423-569.000.
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Hellmers, Emil Donald. Underwater piling restoration system. 4,116,013, Cl. 405-216.000.
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LeGrand, Richard Webster, 4,116,607, Cl. 425-525.000.
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Herman, Hainbuchner. Fastener. 4,116,105, Cl. 85-66.000.
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Herrmann, Henry Otto, Jr., to AMP Incorporated. Miniature universal connector module. 4,116,521, Cl. 339-60.00R.
Hertel, Gunther; and Hertel, Karl Gustav. Roller reinforced with a hard metal jacket. 4,115,910, Cl. 29-123.000.
Hertel, Karl Gustav: *See—*
Hertel, Gunther; and Hertel, Karl Gustav, 4,115,910, Cl. 29-123.000.
Hertzenberg, Elliot P.; Itzkovitch, Irwin Jerry; and Joyce, Ivan H., to PQ Corporation. Process for preparing dispersible boehmite alumina. 4,117,105, Cl. 423-625.000.
Herzl, Peter J.; and Strohmeier, Warren, to Fischer & Porter Co. Contoured obstacle assembly for vortex-type flowmeter. 4,116,058, Cl. 73-194.0VS.
Herzl, Peter J., to Fischer & Porter Co. Multi-range vortex-type flowmeter. 4,116,059, Cl. 73-194.0VS.
Herzog, Milton W., to H. Goodman & Sons, Inc. Packaged articles. 4,116,334, Cl. 206-453.000.
Hesse, Reiner; Pratzer, Hans; Kieser, Manfred; and Edler, Gerhard, to E. Merck. Powdery pearlescent pigment composition. 4,116,628, Cl. 427-154.000.
Hession, Clarence B.; and Hession, Dorothy. Trap setter for beaver traps. 4,115,945, Cl. 43-97.000.

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Higgins, Thomas Engel, to Union Carbide Corporation. Collagen compositions and the method of preparing the same. 4,117,171, Cl. 426-140.000.
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Hildreth, Bradrick Alan; and Stephens, Donald Harrison, to Bourns, Inc. Hearing aid volume control. 4,117,444, Cl. 338-198.000.
Hill, James C.; and Knox, Walter R., to Monsanto Company. Polyester process. 4,116,944, Cl. 528-366.000.
Hill, John B., to G.D. Searle & Co. Process for the preparation of 1-diphenylmethyl-4-(6-methyl-2-pyridylmethyleneamino)piperazine. 4,117,225, Cl. 542-425.000.
Hillier, Edward Lawrence; Graham, Glen Henry; and Eichelberger, Warren Evan, to Abbott Laboratories. Blend of thermoplastic polymers including block radial polymers of the butadiene-styrene type. 4,117,035, Cl. 260-876.00B.
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Hirschfeld, Dieter; and Muller, Manfred, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Method of heat treating cobalt-chromium-molybdenum based alloy and product. 4,116,724, Cl. 148-3.000.
Hisada, Yoshio; Maeda, Kiyoto; and Agui, Hideo, to Sumitomo Chemical Company, Ltd. Systemic antimicrobial quinolines for plant disease. 4,117,136, Cl. 424-258.000.
Hishida, Yukio; Asai, Yuichi; Kondo, Toshikatsu; Asai, Akira; Sakaida, Atsuo; and Miyazawa, Chiaki, to Brother Kogyo Kabushiki Kaisha. Flap-armature electromagnet. 4,117,435, Cl. 335-270.000.
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Inadachi, Masaaki, 4,117,545, Cl. 365-207.000.
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Uchida, Norimasa; Kiyonaga, Kingo; and Nakamura, Hideki, 4,116,684, Cl. 75-126.00C.
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Hochstein, Peter A. Self-tuning deployable antenna. 4,117,495, Cl. 343-877.000.
Hodakowski, Leonard Edward, to Union Carbide Corporation. Radiation curable coating compositions containing an acrylate-capped, polyether urethane and a polysiloxane. 4,116,786, Cl. 204-159.130.
Hodgson, Duncan Barry; Thornton, John Robert; and Rose, Jonathan, to Lucas Industries Limited. Vehicle headlamp control circuits. 4,117,453, Cl. 340-76.000.
Hoechst Aktiengesellschaft: *See*—
Dinter, Peter; Kolbe, Andreas; and Guckes, Reinhold, 4,116,162, Cl. 118-104.000.
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Li, Choh Hao, 4,116,950, Cl. 260-112.50R.
Schwabacher, William Peter, 4,116,353, Cl. 215-274.000.
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Hoffmann, Werner: *See*—
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Hofsass, Peter. Electric temperature protection switch. 4,117,443, Cl. 337-348.000.
Hogberg, Lars Gunnar; and Ekeborg, Bo Gunnar, to Mo och Domsjo Aktiebolag. Apparatus for cutting, felling, and debranching trees. 4,116,249, Cl. 144-3.00D.
Hoglund, Lennart Harry Erik. Electric amplifier. 4,117,418, Cl. 330-296.000.
Hokkai Can Co. Ltd.: *See*—
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Holbek, Carl Christian: *See*—
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Holik, Melville J., to International Minerals & Chemical Corp. Foundry resin components. 4,116,916, Cl. 260-33.20R.
Hollandse Signaalapparaten B.V.: *See*—
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Holle, Werner; and Bletz, Walter, to Ernst Leitz Wetzlar GmbH. Optical objective focus indicator and display. 4,117,325, Cl. 250-209.000.
Holman, Tomlinson M., II, to Advent Corporation. Phonograph preamplifier network with infrasonic cutoff response. 4,117,412, Cl. 330-107.000.
Holmes, Robert G., to Ohio Agricultural Research and Development Center. Sorting system and apparatus. 4,116,339, Cl. 209-699.000.
Holst, Arno; Kostrzewa, Michael; and Buchberger, Gerhard, to Hoechst Aktiengesellschaft. Process for the manufacture of absorbent, modified starch ethers and their use. 4,117,222, Cl. 536-50.000.
Holt, John Ruy. Light fittings. 4,117,535, Cl. 362-382.000.
Hom, Martha C.: *See*—
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Honda, Toshio; Tanuma, Itsuo; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; and Suzuki, Yoshikatsu, to Bridgestone Tire Company Limited. Functional high polymeric substances having α,β-unsaturated carboxylate group and the composition therefrom. 4,117,036, Cl. 260-878.00R.
Honeycutt, Hugh A. Tubing sizer and straightener. 4,116,037, Cl. 72-409.000.
Honeywell Inc.: *See*—
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Hong, Henry Y-P, to Massachusetts Institute of Technology. Lithium ion transport compositions. 4,117,103, Cl. 423-593.000.

Honkawa, Yoshinori, to Ryobi, Ltd. Apparatus for controlling operation cycle of duplicating machine. 4,117,316, Cl. 235-92.0SB.

Honlinger, Herwig: *See*—
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Honma, Hiroshi; and Kakuno, Hiroshi, to Toray Silicone Company, Ltd. Silicone rubber composition useful in shaft seals. 4,116,920, Cl. 260-37.0SB.

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Currey, John E.; McLarty, Colin S.; and Porter, Donald H., 4,116,800, Cl. 204-252.000.

Hoover, Merle Vincent, to RCA Corporation. Bridge amplifiers employing complementary transistors. 4,117,415, Cl. 330-264.000.

Horigome, Takashi: *See*—
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Horiguchi, Hiroshi; and Matsuo, Terumoto, to Kurosaki Refractories Co., Ltd.; and Nippon Steel Corporation. Apparatus for applying a desired sealing pressure between refractory plates of sliding nozzle. 4,116,372, Cl. 222-600.000.

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Horler, Hansulrich; Linsi, Ulrich; and Policke, Oswald, to BBC Brown, Boveri & Company Limited. Dual bearing structure for rotatable machine parts with antifriction and plain bearings. 4,116,502, Cl. 308-9.000.

Hornak, Thomas; and Lucas, Richard C., to Hewlett-Packard Company. Charged splitting method using charge transfer device. 4,117,347, Cl. 307-221.00D.

Hornbaker, Edwin D.; Jones, Jesse D.; Kucsma, Michael E.; and Allen, Thomas S., to Ethyl Corporation. Reinforced polypivalolactone. 4,116,922, Cl. 260-40.00R.

Horstmann, Harald: *See*—
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Moller, Eike; Meng, Karl-August, deceased; Wehinger, Egbert; Horstmann, Harald; and Seuter, Friedel, 4,117,145, Cl. 424-273.00P.

Horvath, László; Major, Ferenc; Gaal, Otto; and Lengyel, Sandor, to Egyesult Izzolampa es Villamossagi Rt. Apparatus for replenishing containers for thin and flexible components. 4,116,328, Cl. 198-648.000.

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Hosaka, Takuo; Sasaki, Tadao; and Suzuki, Hiroshige, to Nippon Crucible Co., Ltd. Process for producing powder of β-type silicon carbide. 4,117,096, Cl. 423-345.000.

Hosoi, Fumio; Hagiwara, Miyuki; and Araki, Kunio, to Japan Atomic Energy Research Institute. Method for cross-linking polyethylene with an ionizing radiation. 4,116,784, Cl. 204-159.160.

Hottinger Baldwin Messtechnik GmbH: *See*—
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Howe, John G. Apparatus for measuring the combined resistance to displacement of strings affixed in a racket head. 4,116,054, Cl. 73-145.000.

Howe, Robert K.: *See*—
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Howell, Thomas H., to United States of America, Army. Automatic balancing concept. 4,116,404, Cl. 244-3.230.

Hsieh, Henry L., to Phillips Petroleum Company. Organoaluminum-organophosphine-metal salt of a beta-diketone catalyst system. 4,116,869, Cl. 252-431.00P.

Hsueh, Limin; Hard, Robert A.; Davidson, Donald H.; and Huff, Ray V., to Kennecott Copper Corporation. In-situ mining method and apparatus. 4,116,488, Cl. 299-4.000.

Huang, Yun-Yang, to Ethyl Corporation. Catalyst for methane production. 4,116,996, Cl. 260-449.60M.

Hubbard, William Marshall; and Muska, Willis Martin, to Bell Telephone Laboratories, Incorporated. Fiber positioning and connection method and apparatus. 4,116,532, Cl. 350-96.210.

Huber, Paul W.: *See*—
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Huber, Wolfgang, to SKF Kugellagerfabriken GmbH. Elongated machine element spherical end. 4,116,500, Cl. 308-9.000.

Hudson, Alan George; and Tawn, Alec Richard Hornsey, to Coates Brothers & Co., Ltd. Polymerizable materials. 4,117,241, Cl. 560-224.000.

Hudson, James Alphus, Jr.; Levandoski, Raymond Alexander; and Long, Allen Kyle, to Western Electric Company, Inc. Method and apparatus for measuring the filling effectiveness of a cable during filling. 4,117,398, Cl. 324-61.00R.

Hudspeth, Emmett L.; Richardson, Philip C.; Neathery, John L., Jr.; Dykstra, Jerald P.; Boger, Allen D., Jr.; Sims, William B., Jr.; Hunt, Glenn E.; and Quisenberry, Tony M., to United States Surgical Corporation. Respiration data acquisition, conversion and display system. 4,116,228, Cl. 128-2.00R.

Hudspeth, Thomas; and Rosen, Harold A., to Hughes Aircraft Company. Multiple channel rotary joint. 4,117,426, Cl. 333-98.0TN.

Huff, Eddie; and Huff, Walter L. Cable type lock for wire wheel hubcaps. 4,116,490, Cl. 301-37.0AT.

Huff, Ray V.: *See*—
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Huffman, Stanley E., to S. E. Huffman Corporation. Programmably controlled machine for grinding end cutting tools and the like. 4,115,956, Cl. 51-96.000.

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Rosen, Harold A., 4,117,423, Cl. 333-9.000.

Hughes, William B., to Phillips Petroleum Company. Process for structural modification of unsaturated alcohols. 4,117,016, Cl. 260-593.00R.

Hunt, Albert Henry, to Motorola, Inc. Circuit for compensating VCO nonlinearities in frequency modulated phase-locked loops and method thereof. 4,117,422, Cl. 331-18.000.

Hunt, Glenn E.: *See*—
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Huntley, Frank Alfred; and Morgan, William Morris, to International Business Machines Corporation. Method of forming matt display electrode. 4,116,754, Cl. 156-656.000.

Hupp, Stephen S.; Sabourin, Edward T.; Swift, Harold E.; and Vogel, Roger F., to Gulf Research & Development Company. Process for removing organic oxygen-containing impurities from an organic composition. 4,117,021, Cl. 260-669.00A.

Hurzeller, Peter; and Degiez, Louis, to Societe Suisse pour l'Industrie Horlogere Management Services, S.A. Swimming pool touch pad construction. 4,117,283, Cl. 200-52.00R.

Hussey, Charles L.: *See*—
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Hussey, Dennis Malcolm; and Coleman, William Martin John, to Haigh Engineering Company Limited, The. Electrical control circuits. 4,117,383, Cl. 318-206.00A.

Huszar, Andor; Szekely, Geza; Rusznak, Istan; Trezl, Lajos; Bertalan, Gyorgy; Zaoui nee Serfozo, Ilona; and Molnar, Imre, to Tiszai Vegy Kombinat. Compounded plastic system. 4,116,897, Cl. 260-17.40R.

Hutchins, Frank. Treatment of conjunctivitis with powdered aluminum. 4,117,115, Cl. 424-148.000.

Hwang, Yu-Tang, to Chemplex Company. Method of polymerizing olefins. 4,117,217, Cl. 526-96.000.

HydroTech International, Inc.: *See*—
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Hyler, John H., to Westinghouse Air Brake Company. Angled roll axis suspension for off-road vehicles. 4,116,298, Cl. 180-139.000.

Hyman, Jeffrey M. Musical tube. 4,116,108, Cl. 84-330.000.

Ichikawa, Tetsuya: *See*—
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Ichikawa, Yataro; Yamamoto, Mamoru; Tsuruta, Hideki; Kato, Kenichi; Yamaji, Teizo; Yoshisato, Eishin; and Hiramatsu, Toshiyuki, to Teijin Limited. Inclusion complex compound, process for its production, and method for its use. 4,116,955, Cl. 260-192.000.

Ichisaka, Teruo; and Ikegami, Tadao, to Chlorine Engineers Corp., Ltd. Bipolar electrode. 4,116,805, Cl. 204-290.00F.

Ideal Toy Corporation: *See*—
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Idesawa, Masanori: *See*—
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Ieda, Michael, to Ideal Toy Corporation. Switch time-delay mechanism for toy gun. 4,117,282, Cl. 200-33.00R.

Igarashi, Akira: *See*—
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Igarashi, Toshifumi: *See*—
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Iida, Hiroshi: *See—*
Takahashi, Susumu; and Iida, Hiroshi, 4,117,406, Cl. 325-348.000.
Ikeda, Hiromichi, to Kabushiki Kaisha Komatsu Seisakusho. Engine radiator with means for noise reduction. 4,116,269, Cl. 165-126.000.
Ikeda, Teruo, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Bobbin utilized for making yarn packages in textile machines. 4,116,403, Cl. 242-165.000.
Ikeda, Yosaku. Method and apparatus for producing baseball bats. 4,116,252, Cl. 144-309.00D.
Ikegami, Tadao: *See—*
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Ikezawa, Tsutomu: *See—*
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Ikoma, Toshiaki: *See—*
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Ilmoniemi, Erkki: *See—*
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Imaeda, Kozo: *See—*
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Imahori, Seiichi; Murata, Yukichi; and Suzuki, Sumio, to Mitsubishi Chemical Industries Ltd. Cyanotriphenodioxazine compound. 4,116,623, Cl. 8-25.000.
Imamoto, Tsunehiko: *See—*
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Imi, Tetsuo: *See—*
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Imperial Chemical Industries Limited: *See—*
Barlow, Charles Brian; and Freeman, Peter Frank Hilary, 4,117,167, Cl. 424-330.000.
Lawson, Ronald; and Watson, David, 4,115,907, Cl. 28-266.000.
Makinson, George Kenneth; and Schofield, David, 4,116,998, Cl. 260-465.00D.
Shephard, Margaret Claire; and Fox, Roland Thomas Victor, 4,117,147, Cl. 424-274.000.
Smith, Frank, 4,116,802, Cl. 204-252.000.
Smith, Leslie Harold, 4,117,157, Cl. 424-304.000.
Sunley, Raymond Leo; and Snowling, Geoffrey David, 4,116,674, Cl. 71-92.000.
Imperial Oil Limited: *See—*
Kizior, Thaddeus Eugene, 4,116,809, Cl. 208-11.0LE.
Inaba, Hideya; Onizuka, Shigenori; and Kamino, Yasumi, to Hitachi Shipbuilding & Engineering Co., Ltd. Method of and catalysts for removal of nitrogen oxides. 4,117,081, Cl. 423-239.000.
Inadachi, Masaaki, to Hitachi, Ltd. Memory including dummy cells. 4,117,545, Cl. 365-207.000.
Incom International, Inc.: *See—*
Langford, William D.; Leuenberger, Dale F.; and Hazlett, Howard A., 4,116,086, Cl. 74-532.000.
Indiana University Foundation: *See—*
Stookey, George K., 4,117,109, Cl. 424-57.000.
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Oskam, Aane Adriaan, 4,116,538, Cl. 350-289.000.
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Azzani, Nino, 4,117,439, Cl. 336-129.000.
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Inouye, Yoshinori; Kanamori, Hiromitsu; Tsuchida, Nobuo; Morishita, Syozo; and Endo, Tetsuhiko, to Toray Industries, Inc. Apparatus for collecting and preparing sample yarns to be tested. 4,116,393, Cl. 242-1.000.
Inox Industria E Comercio de Aco S/A: *See—*
Zinezi, Waldemar, 4,116,392, Cl. 241-296.000.
Institut Dr. Friedrich Forster, Prufgeratebau: *See—*
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Institut National de la Sante et de la Recherche Medicale Inserm: *See—*
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Institute de Recherche des Transports: *See—*
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Institute po Metaloznanie i Technologia na Metalite: *See—*
Nikolov, Ivan Dimov; Rashev, Tzolo Valkov; Ivanov, Rangel Petrov; and Andreev, Chavdar Andreev, 4,116,683, Cl. 75-125.000.
Instituto Grafico Bertello S.p.A.: *See—*
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Instructional/Communications Technology, Inc.: *See—*
Taylor, Stanford Earl; and Brucat, John N., 4,116,547, Cl. 351-31.000.
International Business Machines: *See—*
Libby, Edwin L.; and Miller, Myrl J., 4,116,562, Cl. 355-60.000.
International Business Machines Corporation: *See—*
Anantha, Narasipur Gundappa; Cases, Moises; Chang, Fung Yuel; and Rubin, Barry Jay, 4,117,546, Cl. 365-233.000.
Basi, Jagtar Singh, 4,116,714, Cl. 134-3.000.
Bodner, Ronald Eugene, 4,117,536, Cl. 364-200.000.
Brunner, Friedrich Christian; Schwerdt, Friedrich Wilhelm; and Steinbeck, Hans-Heinz, 4,117,093, Cl. 423-339.000.
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Huntley, Frank Alfred; and Morgan, William Morris, 4,116,754, Cl. 156-656.000.
Libby, Edwin Langford; and Miller, Myrl J., 4,116,554, Cl. 355-11.000.
McGroddy, James Cleary; and Van Vechten, James Alden, 4,117,497, Cl. 346-17.000.
Ning, Tak Hung; Osburn, Carlton Morris; and Yu, Hwa Nien, 4,116,721, Cl. 148-1.500.
Schlig, Eugene Stewart; and Stilwell, George Raymond, Jr., 4,117,471, Cl. 340-324.00M.
Zappe, Hans Helmut, 4,117,503, Cl. 357-5.000.
International Flavors & Fragrances Inc.: *See—*
Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick Louis; and Vock, Manfred Hugo, 4,117,015, Cl. 260-586.00C.
International Harvester Company: *See—*
Orth, Harold R., 4,116,001, Cl. 60-420.000.
International Minerals & Chemical Corp.: *See—*
Harris, Robert Richard; and Pollack, Warren John, 4,116,902, Cl. 260-22.0TN.
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International Radioimmune Systems, Inc.: *See—*
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International Standard Electric Corporation: *See—*
Greenwood, John C., 4,116,531, Cl. 350-96.200.
Haberle, Heinz; and Aubele, Richard, 4,117,267, Cl. 179-15.0BS.
Irven, John, 4,116,653, Cl. 65-2.000.
Krafft, Camille Gabriel; Simonet, Jean-Claude; and Jammes, Emmanuel Marie, 4,117,427, Cl. 335-112.000.
International Telephone and Telegraph Corp.: *See—*
Peecher, Ronald Kaye, 4,117,262, Cl. 179-1.0SW.
Perrotti, Emmanual Joseph, 4,117,488, Cl. 343-100.0PE.
Sawyer, Edgar W., Jr., 4,116,825, Cl. 210-27.000.
Sawyer, Edgar W., Jr., 4,116,826, Cl. 210-27.000.
Sawyer, Edgar W., Jr., 4,116,827, Cl. 210-27.000.
Sawyer, Edgar W., Jr., 4,116,828, Cl. 210-27.000.
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INTERx Research Corporation: *See—*
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Ipsen Industries International Gesellschaft mit beschrankter Haftung: *See—*
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Irick, Gether, Jr.; and Kelly, Charles A., to Eastman Kodak Company. Heterocylic ester, ultraviolet stabilizers and their use in organic compositions. 4,116,928, Cl. 260-45.8NZ.
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Irven, John, to International Standard Electric Corporation. Optical fiber manufacture. 4,116,653, Cl. 65-2.000.
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Iseki, Shuichi: *See—*
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Ishii, Toshihiro: *See—*
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Ishikawa, Toshikatsu; Tanaka, Junichi; Tominaga, Yoichiro; Mat-

subara, Kunio; Kitazume, Yoshihiko; and Hayase, Tokuji, to Nippon Carbon Co., Ltd. Carbon article manufacturing method. 4,117,051, Cl. 264-29.100.

Ishikura, Shinichi: *See*—
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Ishino, Ken; and Watanabe, Takashi, to TDK Electronics Co., Ltd. Coatings for preventing reflection of electromagnetic wave and coating material for forming said coatings. 4,116,906, Cl. 260-22.00A.

Ishizuka, Ichiro: *See*—
Yukinaga, Hisajiro; Sumimoto, Shinzaburo; Ishizuka, Ichiro; and Sugita, Jitsuo, 4,116,671, Cl. 71-88.000.

Ishizuka, Naoyasu: *See*—
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Isowa, Yoshikazu; Ohmori, Muneki; Kurita, Hideaki; Ichikawa, Tetsuya; Sato, Masanari; Mori, Kaoru; and Oyama, Kiyotaka, to (Zaidanhojin) Sagami Chemical Research Center. Process for producing a peptide. 4,116,768, Cl. 195-29.000.

Istoshin, Stanislav Jurievich: *See*—
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Itoh, Kametaro; Takahashi, Wataru; Yamamoto, Yoshun; and Harajiri, Hachiro, to Nippon Steel Corporation. Immersion cooling apparatus for hot metal pipes. 4,116,716, Cl. 134-134.000.

Itoi, Kazuo: *See*—
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ITT Industries, Inc.: *See*—
Belart, Juan, 4,116,495, Cl. 303-115.000.
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Iversen, Poul Christian Carlos; Thorsoe, Flemming; and Hanson, Borge Bernhard, to Danfoss A/S. Control system for charging and discharging an electric storage heater. 4,117,307, Cl. 219-364.000.

Iwaki, Yoshiyuki; and Kuroda, Ryozo, to Mitsubishi Denki Kabushiki Kaisha. Method and apparatus for forming a wound core. 4,116,033, Cl. 72-142.000.

Iwakura, Mituharu: *See*—
Kageyama, Kunio; and Iwakura, Mituharu, 4,116,895, Cl. 260-5.000.

Iwami, Koichi: *See*—
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Iwasaki, Kazumi: *See*—
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Iwata, Yoriaki; and Sato, Suguru, to Robert Bosch GmbH. Double-voltage, automotive-type alternator. 4,117,390, Cl. 322-90.000.

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J. & J. Marquardt: *See*—
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Jackisch, Philip F.; and Worrel, Calvin J. Gasoline compositions. 4,116,644, Cl. 44-73.000.

Jackson, Melvin R.; and Rairden, John R., III, to General Electric Company. Oxidation corrosion resistant superalloys and coatings. 4,117,179, Cl. 427-405.000.

Jacobs, Cornelis Adrianus Joannes; Driessen, Antonius Jozephus Gerardus Cornelis; and Cornelissen, Gerardus Antonius Petrus Maria, to U.S. Philips Corporation. Discharge lamp having a glow discharge starter within the outer envelope. 4,117,370, Cl. 315-35.000.

Jacobs, Herbert V. Modular integrated cooling and heating systems for effluents and other uses. 4,116,267, Cl. 165-110.000.

Jacobs, Israel S.: *See*—
Becker, Joseph J.; Luborsky, Fred E.; Jacobs, Israel S.; and McCary, Richard O., 4,116,728, Cl. 148-108.000.

Jaeger, Mark A. General purpose in vitro anticoagulant. 4,116,635, Cl. 23-230.00B.

Jaekle, William M.; Byrne, Robert; and Giovanelli, Armand, to Southern Pacific Transportation Company. Sliding screen closure for rail cars. 4,116,135, Cl. 105-378.000.

Jahnke, Richard William, to Lubrizol Corporation, The. Hot melt metal working lubricants. 4,116,872, Cl. 252-32.70E.

Jakob, Hans-Dieter; Kubens, Rolf; and Heine, Heinrich, to Bayer Aktiengesellschaft. Hardenable mixtures containing polyfunctional aromatic cyanic acid esters. 4,116,946, Cl. 528-172.000.

Jaluria, Yogesh: *See*—
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James, Michael, to Allen & Hanburys Limited. Device for dispensing medicaments. 4,116,195, Cl. 128-266.000.

Jammes, Emmanuel Marie: *See*—
Krafft, Camille Gabriel; Simonet, Jean-Claude; and Jammes, Emmanuel Marie, 4,117,427, Cl. 335-112.000.

Janson, Jan. Preparation of liquor for delignification or alkali treatment by autocaustization, and the preparation of pulp with this liquor. 4,116,759, Cl. 162-32.000.

Janssen, Daniel Johannes Gerardus, to U.S. Philips Corporation. Current stabilizing circuit. 4,117,391, Cl. 323-4.000.

Japan Atomic Energy Research Institute: *See*—
Hosoi, Fumio; Hagiwara, Miyuki; and Araki, Kunio, 4,116,784, Cl. 204-159.160.

Jarrett, James Oswald: *See*—
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Jarrett, William Fleming Hoggan; Jarrett, James Oswald; and Mackey, Lindsay Joan, to University of Glasgow. Vaccine for prevention of feline leukemia. 4,117,112, Cl. 424-89.000.

Jeakle, Patrick L.: *See*—
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Jenkins, Anthony; and Isgrove, Douglas Walter. Method and apparatus for detecting a constituent in an atmosphere. 4,116,042, Cl. 73-23.000.

Jenness, Raymond C., to Allis-Chalmers Corporation. Ball discharger for grinding mill. 4,116,391, Cl. 241-171.000.

Jensen, Palle Rasmus. Method and apparatus for the examination of bodies. 4,116,074, Cl. 73-607.000.

Jensen, William Kenneth, to O.E.M. Technical Sales, Inc. Transparent thermometer. 4,116,065, Cl. 73-378.000.

Jepsky, Joseph; Englander, Irvin S.; and Williams, James E., to Associated Controls & Communications, Inc. Method and apparatus for locating position in a waterway. 4,117,482, Cl. 343-7.300.

Jer Manufacturing, Inc.: *See*—
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Jet Research Center, Inc.: *See*—
Christopher, Glenn B.; and Regalbuto, John A., 4,116,130, Cl. 102-20.000.
Dines, Jack E., 4,116,110, Cl. 90-12.00R.

Jimerson, Bruce D.; and Nakasone, Henry H. Circuits for starting and operating ionized gas lamps. 4,117,377, Cl. 315-209.00R.

Jochum, Peter: *See*—
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John, Clarence D., Jr., to Westinghouse Electric Corp. Fluid pressure apparatus for recovering fuel pellets from nuclear fuel elements. 4,116,767, Cl. 176-87.000.

John, Clarence D., Jr., to Westinghouse Electric Corp. Nuclear fuel element leak detection system. 4,117,333, Cl. 250-380.000.

John Rohrer Contracting Company: *See*—
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Johns-Manville Corporation: *See*—
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Johnsen, Edward L. Medical information form for plurality of individual reports. 4,116,470, Cl. 283-66.00A.

Johnson, Ben C.; Thornton, J. Scott; Glowe, Donald E.; Cassidy, Patrick E.; and Anderson, Robert E., to Thermon Manufacturing Company. Self-limiting temperature electrical heating cable. 4,117,312, Cl. 219-548.000.

Johnson, Bruce Virgil, to United Technologies Corporation. Method and apparatus for mixing fluid. 4,116,383, Cl. 239-8.000.

Johnson Controls, Inc.: *See*—
Matthews, Russell Byron, 4,116,613, Cl. 431-78.000.

Johnson, Daniel: *See*—
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Johnson, David C.: *See*—
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Johnson, David R.: *See*—
Juckniess, Paul R.; and Johnson, David R., 4,116,801, Cl. 204-247.000.

Johnson, Edward F.; and Carlsen, John S., to Raychem Corporation. Thermally stable hot-melt adhesive composition containing polycarbonate-polydimethylsiloxane block copolymer. 4,117,027, Cl. 260-824.00R.

Johnson, Eugene R.; and Mower, Morris F., to Bliss & Laughlin Industries, Inc. Corner finishing tool. 4,116,604, Cl. 425-458.000.

Johnson, Gordon Carlton: *See*—
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Johnson, John H.: *See*—
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Johnson, Lawrence E.; Conger, William W., IV; and Moreland, Gerald W., to South Pacific Industries. Spa safety drain. 4,115,878, Cl. 4-172.170.

Johnson, Neil E. Tennis training and rating apparatus. 4,116,437, Cl. 273-29.00A.

Johnson, William S.; and Bartlett, Paul A., to Leland Stanford Junior University, The Board of Trustees of the. Intermediate in the synthesis of estrone. 4,117,234, Cl. 560-107.000.

Johnston, James J., to Automatic Equipment Development Corporation. Electrical connector assembly. 4,116,525, Cl. 339-132.00B.
Johnston, Otis A., to Western Geophysical Company of America. Torque equalizer for a hydraulically driven, four-wheel-drive vehicle. 4,116,294, Cl. 180-44.00F.
Jones, Charles. Lubricant metering system for rotary piston mechanism. 4,116,593, Cl. 418-94.000.
Jones, Ivor Wynn, to Chloride Silent Power Limited. Production of beta-alumina ceramic articles. 4,117,056, Cl. 264-57.000.
Jones, Jesse D.: *See*—
Hornbaker, Edwin D.; Jones, Jesse D.; Kucsma, Michael E.; and Allen, Thomas S., 4,116,922, Cl. 260-40.00R.
Jones, John B., Jr.; and Reeves, Adam A., to Paraho Corporation. Indirect heating pyrolysis of oil shale. 4,116,810, Cl. 208-11.00R.
Jones, Lamar J.; and Williams, Carl W., to Lockheed Corporation. Motorized film take-up canister. 4,116,400, Cl. 242-67.10R.
Jones, Leon R. Fertilizer composition and method of making same. 4,116,664, Cl. 71-29.000.
Jones, Paul W.: *See*—
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Jones, Robert: *See*—
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Jones, Robert D., to United States of America, Energy. Apparatus for controlling nuclear core debris. 4,116,764, Cl. 176-38.000.
Jones, Robert J.; O'Rell, Michael K.; and Sutherland, James D., to TRW Inc. Compliant maleimide based plastics. 4,116,937, Cl. 528-170.000.
Jonsson, Nils Ake; Mikiver, Lembit; and Moses, Pinchas, to AB Kabi. Derivatives of substituted isoindolines with effect on the central nervous system. 4,117,144, Cl. 424-274.000.
Jordan, Robert Kenneth. Coproduction of iron and carbon black. 4,116,680, Cl. 75-41.000.
Jorgensen, Allen R.: *See*—
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Jorgensen, Jens L., to Minnesota Mining and Manufacturing Company. Deformable retroreflective pavement-marking sheet material. 4,117,192, Cl. 428-337.000.
Jorgenso, Torben. Method of making a laminated container consisting mainly of thermoplastic material. 4,117,061, Cl. 264-89.000.
Josephs, Patricia A.: *See*—
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Josephy, Karl, to Continental Group, Inc., The. Through hole deformation and inside sealing tear strip. 4,116,359, Cl. 220-265.000.
Joshi, Satish Vishwanath; and Bracher, Douglas Lee, to Lukens Steel Company. Flux for use in electroslag refining process. 4,116,690, Cl. 75-257.000.
Joslin, Robert S.: *See*—
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Juckniess, Paul R.; and Johnson, David R., to Dow Chemical Company, The. Apparatus for electrowinning multivalent metals. 4,116,801, Cl. 204-247.000.
Juhala, Pentti J.: *See*—
Kaartinen, Niilo H.; and Juhala, Pentti J., 4,116,632, Cl. 23-230.0PC.
Junge, Helmut: *See*—
Dimroth, Peter; Junge, Helmut; Tonne, Peter; and Urtel, Rolf, 4,116,953, Cl. 260-157.000.
Jurova, Elena Sergeevna: *See*—
Maslov, Vadim Nikolaevich; Korobov, Oleg Evgenievich; Lupacheva, Alla Naumovna; Vlasov, Alexandr Nikolaevich; Myasoedov, Viktor Vasilievich; Bochkarev, Ellin Petrovich; Gimelfarb, Felix Aronovich; Bronshtein, Izidor Karlovich; Lukicheva, Natalya Ivanovna; Sinitsyn, Evgeny Vladimirovich; Sokurenko, Jury Varnavovich; Jurova, Elena Sergeevna; Kistova, Elena Mikhailovna; Konstantinova, Marina Andreevna; and Samaginov, Veniamin Mikhailovich, 4,117,504, Cl. 357-16.000.
Kaarlela, William Thomas, to General Dynamics Corporation. Alloy and structures made therefrom. 4,116,688, Cl. 75-229.000.
Kaarlela, William Thomas, to General Dynamics Corporation. Material and method for securing boron filaments to each other and to a substrate and cutting tools therefrom. 4,116,689, Cl. 75-229.000.
Kaartinen, Niilo H.; and Juhala, Pentti J., to Packard Instrument Company, Inc. Countercurrent combustion system for preparing radioactive samples and the like. 4,116,632, Cl. 23-230.0PC.
Kabel-und Metalwerke Gutehoffnungshutte AG.: *See*—
Voigt, Hermann Uwe; Volker, Martin; and Stehmann, Hans Peter, 4,117,063, Cl. 264-102.000.
Kabushiki Kaisha Daini Seikosha: *See*—
Moriya, Tokio, 4,115,993, Cl. 58-38.00R.
Kabushiki Kaisha Komatsu Seisakusho: *See*—
Ikeda, Hiromichi, 4,116,269, Cl. 165-126.000.
Tanahashi, Sakae; and Shima, Takashi, 4,116,050, Cl. 73-88.50R.
Kabushiki Kaisha Tokai Rika Denki Seisakusho: *See*—
Nomura, Kenichiro; Mori, Mamoru; Yasumatsu, Jun; Kubota, Tatsushi; Hachisuka, Sadao; and Tatematsu, Kazuhisa, 4,116,402, Cl. 242-107.100.
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Ikeda, Teruo, 4,116,403, Cl. 242-165.000.
Kabushikikaisha Nippon Keikinzoku Sogokenkyusho: *See*—
Kobayashi, Yoshiyuki; and Okaniwa, Shigeru, 4,116,030, Cl. 72-40.000.
Kaeding, Warren W., to Mobil Oil Corporation. Ethylation of aromatic compounds. 4,117,024, Cl. 260-671.00R.
Kaempf, Bernd: *See*—
Lehn, Jean-Marie; Schue, Francois; Boileau, Sylvia; Kaempf, Bernd; Cau, Alain Andre; Moinard, Jean Robert; and Raynal, Serge Fernand, 4,116,887, Cl. 260-2.00A.
Kagami, Akiyasu; Hase, Takashi; Mimura, Yoshiyuki; Narita, Kinichiro; and Hiraki, Minoru, to Dai Nippon Toryo Co. Ltd. Fluorescent compositions for low-velocity electron excited fluorescent display devices. 4,116,864, Cl. 252-301.60S.
Kagerhuber, Franz; Scheinecker, Alois; and Scheurecker, Werner, to Vereinigte Osterreichische Elsen- und Stahlwerke - Alpine Montan Aktiengesellschaft. Arcuate supporting and guiding construction for continuously cast strands. 4,116,262, Cl. 164-448.000.
Kageyama, Kunio; and Iwakura, Mituharu, to Yokohama Rubber Co., Ltd., The. Puncture sealant composition. 4,116,895, Cl. 260-5.000.
Kajino, Jirou; and Iwasaki, Kazumi, to Matsushita Electric Industrial Co., Ltd. Magnetic tape cartridge recording apparatus with manually actuated tape threading and tape rewind. 4,117,520, Cl. 360-95.000.
Kakogawa, Genjiro; Suzuki, Tetsumi; Goko, Nobuaki; and Mukuraguchi, Koji, to Mitsubishi Chemical Industries Limited. Process for producing stabilized polyolefins. 4,117,219, Cl. 528-494.000.
Kakuno, Hiroshi: *See*—
Honma, Hiroshi; and Kakuno, Hiroshi, 4,116,920, Cl. 260-37.0SB.
Kalfus, Martin Aaron; and Becke, Hans Werner, to RCA Corporation. Switching circuit. 4,117,350, Cl. 307-252.00C.
Kalfus, Martin Aaron; and Baugher, Dale Milton, to RCA Corporation. Transistor switching circuit. 4,117,351, Cl. 307-252.00C.
Kali-Chemie Pharma GmbH.: *See*—
Thies, Peter Willibrord; and David, Samuel, 4,117,148, Cl. 424-278.000.
Kali und Salz Aktiengesellschaft: *See*—
Kunze, Dietmar, 4,117,078, Cl. 423-163.000.
Kalinin, Elvin Konstantinovich: *See*—
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.
Kalininskaya, Vera Nikolaevna: *See*—
Kolosov, Ivan Alexandrovich; Ivanyatov, Jury Egorovich; and Kalininskaya, Vera Nikolaevna, 4,116,803, Cl. 204-272.000.
Kalisch, Alfons: *See*—
Forster, Friedrich M. O.; and Kalisch, Alfons, 4,117,403, Cl. 324-240.000.
Kallaby, Joseph: *See*—
Smiggen, Frank J.; Burry, Devitt S.; Kallaby, Joseph; and Goltz, Wayne H., 4,116,715, Cl. 134-6.000.
Kaloi, Cyril M., to United States of America, Navy. Corner fed electric microstrip dipole antenna. 4,117,489, Cl. 343-700.0MS.
Kamei, Kiyoo; Ikoma, Toshiaki; Tokuda, Hirokuni; and Frey, Jeffrey, to Tokyo Shibaura Electric Co.; and Ikoma, Toshiaki. Method for manufacturing compound semiconductor devices. 4,116,722, Cl. 148-1.500.
Kameyama, Tsutomu; Yoshina, Shigetaka, deceased (by Yoshina, Teruko, heir at law by Takamina); and Yoshina, Yoshina, heir at law, to Fuji Chemical Industry Company Limited. Anti-inflammatory 1-oxo-isoindoline derivatives and processes for their preparation. 4,116,972, Cl. 260-326.100.
Kamezaki, Masaaki, to Taisei Kosan Kabushiki Kaisha. Air pressure control apparatus for a hot or cold storage chamber. 4,116,213, Cl. 137-360.000.
Kaminka, Mikhail Emmanuilovich: *See*—
Mashkovsky, Mikhail Davydovich; Yakhontov, Leonid Nikolaevich; Ado, Andrei Dmitrievich; Kaminka, Mikhail Emmanuilovich; Mikhlina, Eva Evseevna; Vorobieva, Valentina Yakovlevna; Yanina, Anna Dmitrievna; and Komarova, Nadezhda Andreevna, 4,117,139, Cl. 424-267.000.
Kamino, Yasumi: *See*—
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Kanamori, Hiromitsu: *See*—
Inouye, Yoshinori; Kanamori, Hiromitsu; Tsuchida, Nobuo; Morishita, Syozo; and Endo, Tetsuhiko, 4,116,393, Cl. 242-1.000.
Kandaurov, Zakhar Ivanovich: *See*—
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich;

Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.

Kandler, Georg: *See*—
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Kao Soap Co., Ltd.: *See*—
Sato, Atsushi; and Kawaguchi, Hikotarou, 4,115,982, Cl. 53-534.000.

Kaplan, Nathan O.: *See*—
Goodman, Murray; Verlander, Michael S.; Kaplan, Nathan O.; and Venter, J. Craig, 4,116,949, Cl. 260-112.50R.

Kaplan, Sheldon; Curley, Edward M.; and Homan, Gerlof, to Survival Technology, Inc. Additive adapter. 4,116,196, Cl. 128-272.300.

Karalis, Anastasios J.: *See*—
Longley, Kermit D.; and Karalis, Anastasios J., 4,117,237, Cl. 560-151.000.

Kase, Hiroaki: *See*—
Masuda, Noboru; Nishino, Yu; and Kase, Hiroaki, 4,117,523, Cl. 360-110.000.

Kataoka, Tohri; and Imi, Tetsuo, to Nippon Steel Corporation. Apparatus for supplying powder to continuous casting mold. 4,116,367, Cl. 222-144.500.

Kato, Hisatoyo: *See*—
Miyahara, J[illegible]ji; and Kato, Hisatoyo, 4,116,911, Cl. 260-28.50A.

Kato, Kenichi: *See*—
Ichikawa, Yataro; Yamamoto, Mamoru; Tsuruta, Hideki; Kato, Kenichi; Yamaji, Teizo; Yoshisato, Eishin; and Hiramatsu, Toshiyuki, 4,116,955, Cl. 260-192.000.

Katoh, Hiroshi; Onoe, Yasumitsu; Akisue, Osamu; and Mochinaga, Kishio, to Nippon Steel Corporation. Method for treating continuously cast steel slabs. 4,116,729, Cl. 148-111.000.

Katoh, Sunao: *See*—
Tanimoto, Akira; Yoshida, Yukihiro; and Katoh, Sunao, 4,116,144, Cl. 112-158.00E.

Katz, Donald L.: *See*—
Cook, Harold L., Jr.; Geer, Ernest C.; and Katz, Donald L., 4,116,276, Cl. 166-314.000.

Kauf, Alois; Kandler, Georg; Rossmann, Axel; and Nustede, Fritz, to Motoren- und Turbinen-Union Munchen GmbH. Centrifugal blade for a turbine - rotor method for making the same. 4,116,149, Cl. 113-116.00D.

Kauffman, Robert N.: *See*—
Smith, James D. B.; and Kauffman, Robert N., 4,117,361, Cl. 310-208.000.

Kaufhold, Manfred; and Bankwitz, Gottfried, to Chemische Werke Huls AG. Method for preparing straight chain primary alcohols from 1-bromoalkanes. 4,117,251, Cl. 568-877.000.

Kaufman, William. Pattern reproduction table. 4,116,563, Cl. 355-91.000.

Kawabata, Hidetoshi: *See*—
Tanaka, Susumu; Ogawa, Masaya; Kawabata, Hidetoshi; Fujiwara, Takao; Kurita, Takaji; Enoguchi, Yuji; Wada, Kenichi; and Murasaki, Hiroshi, 4,116,556, Cl. 355-3.0SH.

Kawabe, Hidehiko: *See*—
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Kawada, Kosaku: *See*—
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Kawaguchi, Hikotarou: *See*—
Sato, Atsushi; and Kawaguchi, Hikotarou, 4,115,982, Cl. 53-534.000.

Kawaike, Kazuo; Uchiya, Tsuneo; and Sato, Ichiro, to Hitachi Plant Engineering & Construction. Insulator bushing for high voltage input. 4,117,255, Cl. 174-31.00R.

Kawakami, Hideo; and Ebata, Hitoshi, to Toshiba Kikai Kabushiki Kaisha. Automatic fret sawing machines. 4,116,101, Cl. 83-747.000.

Kawakatsu, Kunio: *See*—
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Kawamura, Takashi: *See*—
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Kawasaki, Hideo; Nakatani, Masaji; Ishii, Toshihiro; Nakagawa, Hiroshi; and Takaya, Hiroshi, to Nissan Engineering Ltd. Process for regenerating permanganate and/or manganate from manganese dioxide. 4,117,080, Cl. 423-235.000.

Keat, Gordon Samuel, to English Clays Lovering Pochin & Company Limited. Separation of solids and liquids. 4,116,831, Cl. 210-68.000.

Kehl, William L.: *See*—
Cronauer, Donald C.; and Kehl, William L., 4,116,808, Cl. 208-10.000.

Keifert, Hibbard G., to Fansteel Inc. Corrosion and erosion resistant lined equipment. 4,117,201, Cl. 428-591.000.

Keimpema, Keimpe Klaas: *See*—
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Keibel, Donald William, to Borg-Warner Corporation. Compact manual transmission for a transversely mounted engine. 4,116,082, Cl. 74-360.000.

Kelly, Charles A.: *See*—
Irick, Gether, Jr.; and Kelly, Charles A., 4,116,928, Cl. 260-45.8NZ.

Kelso, Charles R.: *See*—
Mayer, Endre A.; and Kelso, Charles R., 4,116,185, Cl. 123-139.0AW.

Kemper, Kate. Convertible dough makeup line for the production of different kinds of bread. 4,116,120, Cl. 99-483.000.

Kendall Company, The: *See*—
Poole, Ernest G.; and Hair, Lucius M., 4,115,911, Cl. 29-401.00D.
Shah, Nayan S., 4,116,201, Cl. 128-351.000.
Taylor, Glenn N., 4,115,902, Cl. 16-179.000.

Kende, Andrew S., to Tsay, Yuh-Geng; and Research Corporation. 5,12-Epoxy-naphthacene-6,11-dione derivatives. 4,116,981, Cl. 260-346.710.

Kenkare, Divaker B.; Hall, Robert T., II; and Carson, John C., Jr., to Colgate-Palmolive Company. Two chambered mixing container. 4,116,354, Cl. 220-20.000.

Kenkyusho, Rikagaku: *See*—
Goto, Eiichi; Souma, Takashi; Idesawa, Masanori; and Tanaka, Kazumitsu, 4,117,340, Cl. 250-492.00A.

Kennecott Copper Corporation: *See*—
Hsueh, Limin; Hard, Robert A.; Davidson, Donald H.; and Huff, Ray V., 4,116,488, Cl. 299-4.000.

Kennedy, Arvest Gethner. Toggle bolt wing nut retainer. 4,116,104, Cl. 85-3.00S.

Kennedy, Richard B., to General Recycling Corporation. Method and apparatus for removing liquid from a slurry of solid material. 4,116,760, Cl. 162-56.000.

Kenoff, Michael B., to Warner-Lambert Company. Immunoassay device. 4,116,638, Cl. 422-99.000.

Keogh, Marvin J., to Air Medic, Inc. Stretcher supporting structure for airplanes, or the like. 4,115,884, Cl. 5-82.00R.

Kernforschungsanlage Julich, Gesellschaft mit beschrankter Haftung: *See*—
Mallek, Heinz; Jablonski, Werner; and Pelzer, Peter, 4,116,136, Cl. 110-251.000.

Kessler, Milton. Cutting board. 4,116,426, Cl. 269-307.000.

Kessler Products Company: *See*—
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Keuffel & Esser Company: *See*—
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Khan, Abid: *See*—
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Khan, Riaz Ahmed; Mufti, Khizar Sultan; and Parker, Kenneth John, to Tate & Lyle Limited. Preparation of sucrose 6,6'-dichloro hexa-acetate. 4,117,224, Cl. 536-119.000.

Khanukova, Elina Sergeevna: *See*—
Tsirkin, Mark Zakharovich; Kogan, Viktor Ovshievich; Polyakov, Rudolf Semenovich; Presnov, Jury Leonidovich; and Khanukova, Elina Sergeevna, 4,117,362, Cl. 310-214.000.

Khattab, Ghazi: *See*—
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Kiddie Products, Inc.: *See*—
Panicci, Richard L., 4,116,202, Cl. 128-359.000.

Kiebala, Carol L. Diet control apparatus. 4,117,461, Cl. 340-545.000.

Kielhorn, Werner: *See*—
Wicker, Helmut; Kielhorn, Werner; and Heyduk, Gerhard, 4,117,293, Cl. 219-10.410.

Kieser, Manfred: *See*—
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Kikkoman Shoyu Co. Ltd.: *See*—
Noda, Fumio; Mogi, Keitaro; and Sakasai, Toshio, 4,117,169, Cl. 426-7.000.

Kikumoto, Ryoji: *See*—
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,117,127, Cl. 424-247.000.

Kikura, Katsuaki; Nomura, Hiroshi; and Takeda, Kiyohiro, to Toyo Kogyo Co. Ltd. Trochoidal rotary piston engine with bypass of compressed mixture to exhaust chamber. 4,116,190, Cl. 123-202.000.

Kilburn, Ronald Lee, to H.F.E., Inc. Hydraulic beet harvester. 4,116,279, Cl. 171-58.000.

Kile, Gholz, Bernstein & Georges: *See*—
Barbour, William P., 4,116,106, Cl. 85-71.000.

Kim, Kirk J.; and Muller, Michael, to Datanetics Corporation. Contactless keyswitch for keyboards. 4,117,438, Cl. 336-75.000.

Kim, Raymond W. H.; and Prelletz, Edward R., to Bell & Howell Company. Projector reset-auto stop mechanism. 4,116,550, Cl. 352-124.000.

Kim, Raymond W. H.; Lueders, Arthur L.; Prelletz, Edward R.; and Warden, Gerald D., to Bell & Howell Company. Projector auto rewind mechanism. 4,116,551, Cl. 352-124.000.

Kimura, Takeji: *See*—
Tsunoo, Masahiko; Hirose, Namio; Kimura, Takeji; Inoue, Michihiro; and Sato, Masaharu, 4,116,102, Cl. 84-1.220.

King, Arthur S. Clarifier and method. 4,116,789, Cl. 204-180.00R.

King, David W.: *See*—
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King, Earle Cochran, to Mine Safety Appliances Company. Apparatus for increasing the pH of waste water. 4,116,834, Cl. 210-96.00R.

King, Lowell A.: *See*—
Nardi, John C.; Hussey, Charles L.; Erbacher, John K.; King, Lowell A.; and Fannin, Armand A., Jr., 4,117,207, Cl. 429-103.000.

King, Michael H.: *See*—
Larkin, Mark E.; and King, Michael H., 4,115,954, Cl. 49-240.000.

Kinghorn, John S.; Wagoner, Robert B.; and Turala, Alfred J., to

Aerojet-General Corporation. Weather and vapor seal for storage tank. 4,116,358, Cl. 220-222.000.

Kinney, Layton F.: *See—*
Lietz, Dennis E.; and Kinney, Layton F., 4,116,903, Cl. 260-22.0CB.

Kinsinger, Malcolm H.: *See—*
Schimpf, James E.; Boggs, Roger L.; and Kinsinger, Malcolm H., 4,116,497, Cl. 305-41.000.

Kintigh, Stanley S.; and Lilienthal, Clarence D., to Research Incorporated. SCR controller having input pulses mechanically generated by a signal source. 4,117,392, Cl. 323-21.000.

Kirchoff, Francis D.; and Washburn, Ellis K., to Alco Electronic Products, Inc. Subminiature, three position, switch with non-sliding rocker contact. 4,117,284, Cl. 200-67.00G.

Kirikov, Dmitry Arkadievich: *See—*
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.

Kirpichnikov, Felix Petrovich: *See—*
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Kirsch Company: *See—*
Ford, James A., 4,115,899, Cl. 16-87.40R.

Kishimoto, Keiichi; and Suzuki, Masahiko, to Toray Silicone Company, Ltd. Room-temperature moisture-curing silicone elastomer compositions and a method for their production. 4,116,935, Cl. 528-34.000.

Kistova, Elena Mikhailovna: *See—*
Maslov, Vadim Nikolaevich; Korobov, Oleg Evgenievich; Lupacheva, Alla Naumovna; Vlasov, Alexandr Nikolaevich; Myasoedov, Viktor Vasilievich; Bochkarev, Ellin Petrovich; Gimelfarb, Felix Aronovich; Bronshtein, Izidor Karlovich; Lukicheva, Natalya Ivanovna; Sinitsyn, Evgeny Vladimirovich; Sokurenko, Jury Varnavovich; Jurova, Elena Sergeevna; Kistova, Elena Mikhailovna; Konstantinova, Marina Andreevna; and Samaginov, Veniamin Mikhailovich, 4,117,504, Cl. 357-16.000.

Kitahara, Tomohiro, to Olympus Optical Co., Ltd. Blood serum applicator. 4,116,637, Cl. 422-63.000.

Kitai, Yasuo, to Shin-Kobe Electric Machinery Co., Ltd. Electric storage battery. 4,117,205, Cl. 429-86.000.

Kitamura, Chiharu; and Ando, Bunichi, to Trio Kabushiki Kaisha. Lock release mechanism for push button levers in a tape recorder. 4,116,078, Cl. 74-10.270.

Kitano, Yoshikazu, to Nitto Kasei Co. Ltd. Halogen-containing resin composition containing organic substance as stabilizer. 4,117,029, Cl. 260-836.000.

Kitazume, Yoshihiko: *See—*
Ishikawa, Toshikatsu; Tanaka, Junichi; Tominaga, Yoichiro; Matsubara, Kunio; Kitazume, Yoshihiko; and Hayase, Tokuji, 4,117,051, Cl. 264-29.100.

Kittsmiller, Robert K.: *See—*
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Kiyonaga, Kingo: *See—*
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Kizior, Thaddeus Eugene, to Canada, Her Majesty the Queen in right of, as represented by the Minister of Energy, Mines and Resources; Her Majesty the Queen in right of the Province of Alberta, Government of the Province of Alberta, Department of Energy and Natural Resources, Alberta Syncrude Equity; Ontario Energy Corporation; Imperial Oil Limited; Canada-Cities Service, Ltd.; and Gulf Oil Canada Limited. Deaerator circuit for bitumen froth. 4,116,809, Cl. 208-11.0LE.

Klaubert, Dieter H.: *See—*
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Klaus, Michael Josef; and Pawson, Beverly Ann, to Hoffmann-La Roche Inc. Polyene compounds. 4,116,975, Cl. 260-332.20A.

Klausner, Judah; and Hotto, Robert. Electronic pocket directory. 4,117,542, Cl. 364-900.000.

Klaxon S.A.: *See—*
Warnod, Bertrand Antoine, 4,116,158, Cl. 116-142.00R.

Klebe, Hans; Knippschild, Gerd; and Schuster, Hubert, to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler. Continuous process for the production of a compact, coarse sodium percarbonate. 4,117,097, Cl. 423-415.00P.

Kleinewefers Industrie-Companie GmbH: *See—*
Lopata, Karl Peter; and Schiffer, Gunter, 4,116,022, Cl. 68-5.00D.

Kleinkopf, Dick L. Spectacle lens marking device. 4,115,924, Cl. 33-174.00A.

Klemann, Lawrence P.: *See—*
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Klemchuk, Peter: *See—*
Dexter, Martin; Knell, Martin; Klemchuk, Peter; and Stephen, John F., 4,116,930, Cl. 260-45.80N.

Klenk, Herbert; and Offermanns, Heribert, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of benzoyl cyanide (II). 4,117,008, Cl. 260-545.00R.

Kline, James E. Collapsible telescopic water pipe. 4,116,204, Cl. 131-173.000.

Kline, Richard H., to Goodyear Tire & Rubber Company, The. Stabilized polymeric compositions. 4,117,240, Cl. 560-221.000.

Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Kramer, Peter; and Buchholz, Peter, 4,116,483, Cl. 296-28.00C.
Unkelbach, Karl-Heinz; and Duren, Gottfried, 4,116,839, Cl. 210-222.000.
Zenker, Walter, 4,116,090, Cl. 74-745.000.

Klutchko, Sylvester; and von Strandtmann, Max, to Warner-Lambert Company. 1-Benzoxepino[4,3-c]pyridines. 4,116,966, Cl. 260-294.900.

Klutchko, Sylvester: *See—*
von Strandtmann, Max; Cohen, Marvin P.; Klutchko, Sylvester; and Shavel, John, Jr., 4,116,971, Cl. 260-308.00D.

KMS Fusion, Inc.: *See—*
Moncur, Norman K.; and Mayer, Frederick J., 4,116,542, Cl. 350-321.000.

Knapp, Helmut: *See—*
Behr, Karl-Gunter; and Knapp, Helmut, 4,117,513, Cl. 354-187.000.

Knapp, Kenneth K.; and Cornell, Charles R., to Eaton Corporation. Control for a variable displacement pump or motor. 4,116,002, Cl. 60-445.000.

Knechtel, Wilhelm; and Tokiwa, Taisuke, to Canon Kabushiki Kaisha. Copying apparatus. 4,116,561, Cl. 355-57.000.

Knell, Martin: *See—*
Dexter, Martin; Knell, Martin; Klemchuk, Peter; and Stephen, John F., 4,116,930, Cl. 260-45.80N.

Knippschild, Gerd: *See—*
Klebe, Hans; Knippschild, Gerd; and Schuster, Hubert, 4,117,097, Cl. 423-415.00P.

Knoll, Gunter: *See—*
Kogler, Horst; Honlinger, Herwig; Himmler, Gunther; and Knoll, Gunter, 4,116,055, Cl. 73-146.000.

Knollmueller, Karl O., to Olin Corporation. Alkoxysilane double cluster compounds with silicone bridges and their preparation and use. 4,116,847, Cl. 252-78.300.

Knox, Walter R.: *See—*
Hill, James C.; and Knox, Walter R., 4,116,944, Cl. 528-366.000.

Kobayashi, Reiko: *See—*
Gotoh, Hideo; Igarashi, Akira; Kobayashi, Reiko; and Akiho, Kiyotake, 4,117,199, Cl. 428-486.000.

Kobayashi, Yoshiyuki; and Okaniwa, Shigeru, to Kabushikikaisha Nippon Keikinzoku Sogokenkyusho. Method of making profiled work of aluminum or aluminum alloy by extruding process. 4,116,030, Cl. 72-40.000.

Kobusch, Wolfram: *See—*
Hell, August; Kobusch, Wolfram; and Braun, Fritz, 4,115,981, Cl. 53-55.000.

Kobylinski, Thaddeus P.; and Swift, Harold E., to Gulf Research & Development Company. Hydrocarbon synthesis using a rare earth promoted metal silicate. 4,116,995, Cl. 260-449.60M.

Koch, George Paul, to Fiat-Allis Construction Machinery, Inc. Steering clutch and single pedal brake control system for crawler tractor. 4,116,214, Cl. 137-522.000.

Koch, Heinrich; and Lehnen, Josef, to Koch, Heinrich; and Bayer Aktiengesellschaft. Process for the production of preplasticized materials. 4,117,073, Cl. 264-349.000.

Koch, Henning: *See—*
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Kochergin, Jury Sergeevich: *See—*
Korshak, Vasily Vladimirovich; Vinogradova, Svetlana Vasilievna; Storozhuk, Ivan Pavlovich; Valetsky, Petr Maximilianovich; Sokolov, Lev Borisovich; Mikitaev, Abdulakh Kazbulatovich; Askadsky, Andrei Alexandrovich; Kochergin, Jury Sergeevich; Slonimsky, Grigory Lvovich; Shirokova, Larisa Borisovna; Nebosenko, Ljudmila Fedorovna; and Zhuravlev, Nikolai Danilovich, 4,116,940, Cl. 528-173.000.

Koda, Minoru: *See—*
Shioyama, Tadao; and Koda, Minoru, 4,117,519, Cl. 360-84.000.

Koenig, Paul W., to General Electric Company. Pressurizable semiconductor pellet assembly. 4,117,508, Cl. 357-81.000.

Koenig, Ronald Dean, to Hartel Corporation. Liquid and solids separator. 4,116,843, Cl. 210-391.000.

Koerner, Dieter F. Climbing type gymnastic apparatus. 4,116,433, Cl. 272-85.000.

Koert, James M.: *See—*
Marshall, Vincent P.; Elrod, David W.; Koert, James M.; Reisender, Elizabeth A.; and Wiley, Paul F., 4,116,769, Cl. 195-51.00R.

Kogan, Viktor Ovshievich: *See—*
Tsirkin, Mark Zakharovich; Kogan, Viktor Ovshievich; Polyakov, Rudolf Semenovich; Presnov, Jury Leonidovich; and Khanukova, Elina Sergeevna, 4,117,362, Cl. 310-214.000.

Kogler, Horst; Honlinger, Herwig; Himmler, Gunther; and Knoll, Gunter, to Gebr. Hofmann, G.m.b.H. & Co., Maschinenfabrik. Tire inspecting apparatus. 4,116,055, Cl. 73-146.000.

Kolbe, Andreas: *See—*
Dinter, Peter; Kolbe, Andreas; and Guckes, Reinhold, 4,116,162, Cl. 118-104.000.

Koller, Gerald: *See—*
Hellmer, Lars; Koller, Gerald; Al Muddarris, Ghazi Rashid; and Sud, Kuldip Kumar, 4,117,100, Cl. 423-569.000.

Koller, Josef; and Koller, Stefan, to Ciba-Geigy Corporation. Dyeing preparations and process for dyeing polyacrylonitrile material in strong, neutral, clear blue shades. 4,116,622, Cl. 8-25.000.

Koller, Stefan: *See—*
Koller, Josef; and Koller, Stefan, 4,116,622, Cl. 8-25.000.

Kolosov, Ivan Alexandrovich; Ivanyatov, Jury Egorovich; and Kalininskaya, Vera Nikolaevna. Method and apparatus for forming cermet electrodes for alkaline accumulators. 4,116,803, Cl. 204-272.000.

Komandi, Gyorgy: *See—*
Laib, Lajos; Komandi, Gyorgy; Polyak, Nandor; and Bolyky, Janos, 4,116,051, Cl. 73-116.000.

Komarova, Nadezhda Andreevna: *See—*
Mashkovsky, Mikhail Davydovich; Yakhontov, Leonid Nikolaevich; Ado, Andrei Dmitrievich; Kaminka, Mikhail Emmanuilovich; Mikhlina, Eva Evseevna; Vorobieva, Valentina Yakovlevna; Yanina, Anna Dmitrievna; and Komarova, Nadezhda Andreevna, 4,117,139, Cl. 424-267.000.

Komatsu, Toshiaki: *See—*
Yamada, Hirotada; Okamura, Kosaku; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,117,126, Cl. 424-246.000.

Komeya, Katsutoshi; Inoue, Hiroshi; and Ohta, Takao, to Tokyo Shibaura Electric Co., Ltd. Method of making α type silicon nitride powder. 4,117,095, Cl. 423-344.000.

Kondo, Toshihiro, to Toshihiro Kondo; and Fuji Photo Film Co., Ltd. Automatic exposure control apparatus in a camera. 4,117,500, Cl. 354-23.00D.

Kondo, Toshikatsu: *See—*
Hishida, Yukio; Asai, Yuichi; Kondo, Toshikatsu; Asai, Akira; Sakaida, Atsuo; and Miyazawa, Chiaki, 4,117,435, Cl. 335-270.000.

Kondratieva, Galina Alexeevna: *See—*
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.

Kongpricha, Santad, to Olin Corporation. Wet process phosphoric acid produced using gypsum-containing waste water. 4,117,091, Cl. 423-320.000.

Koninklijke Nederlandsche Hoogovens en Staalfabrieken N.V.: *See—*
Radstake, Herman; Hasenack, Nicolas A.; Van Latenstein, Anthonie; and Burger, Jacobus J., 4,116,681, Cl. 75-41.000.

Konishiroku Photo Industry Co., Ltd.: *See—*
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Konstantinova, Marina Andreevna: *See—*
Maslov, Vadim Nikolaevich; Korobov, Oleg Evgenievich; Lupacheva, Alla Naumovna; Vlasov, Alexandr Nikolaevich; Myasoedov, Viktor Vasilievich; Bochkarev, Ellin Petrovich; Gimelfarb, Felix Aronovich; Bronshtein, Izidor Karlovich; Lukicheva, Natalya Ivanovna; Sinitsyn, Evgeny Vladimirovich; Sokurenko, Jury Varnavovich; Jurova, Elena Sergeevna; Kistova, Elena Mikhailovna; Konstantinova, Marina Andreevna; and Samaginov, Veniamin Mikhailovich, 4,117,504, Cl. 357-16.000.

Kontar, Evgeny Alexeevich: *See—*
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Koons, Russell E.: *See—*
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Kopineck, Hermann-Josef: *See—*
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Koppers Company, Inc.: *See—*
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Koptyazhin, Nikolai Nikolaevich: *See—*
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Korshak, Vasily Vladimirovich; Vinogradova, Svetlana Vasilievna; Storozhuk, Ivan Pavlovich; Valetsky, Petr Maximilianovich; Sokolov, Lev Borisovich; Mikitaev, Abdulakh Kazbulatovich; Askadsky, Andrei Alexandrovich; Kochergin, Jury Sergeevich; Slonimsky, Grigory Lvovich; Shirokova, Larisa Borisovna; Nebosenko, Ljudmila Fedorovna; and Zhuravlev, Nikolai Danilovich. Poly/arylatesulphones/and method of preparing same. 4,116,940, Cl. 528-173.000.

Koskimies, Jouni; and Ilmoniemi, Erkki, to Valmet Oy. Damping structure in a pipe system delivering pulp suspension to a headbox. 4,116,259, Cl. 162-380.000.

Kostrzewa, Michael: *See—*
Holst, Arno; Kostrzewa, Michael; and Buchberger, Gerhard, 4,117,222, Cl. 536-50.000.

Koyanagi, Yukio, to Matsushita Electric Industrial Co., Ltd. Digital-to-analog converter. 4,117,476, Cl. 340-347.0DA.

Kozlov, Nikolai Alexandrovich: *See—*
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.

Krafft, Camille Gabriel; Simonet, Jean-Claude; and Jammes, Emmanuel Marie, to International Standard Electric Corporation. Standardized component for cross-point matrices. 4,117,427, Cl. 335-112.000.

Kragt, Gerald A., to Jer Manufacturing, Inc. Building construction and method and kit therefore. 4,115,967, Cl. 52-90.000.

Krajewski, Richard M.: *See—*
Erickson, Robert E.; and Krajewski, Richard M., 4,117,184, Cl. 428-224.000.

Kramer, Elmer C.: *See—*
Hall, Roy F.; and Kramer, Elmer C., 4,116,580, Cl. 408-230.000.

Kramer, Peter; and Buchholz, Peter, to Klockner-Humboldt-Deutz Aktiengesellschaft. Window for vehicle cabs, especially for vehicles employed in agriculture and in construction. 4,116,483, Cl. 296-28.00C.

Krapfenbauer, Hans; and Grob, Ernst, to Ernst Grob. Method and apparatus for manufacturing straight or inclined toothed machine elements, especially spur gears by cold working. 4,116,032, Cl. 72-68.000.

Krasnikova, Oxana Kirillovna: *See—*
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.

Krause, Herbert: *See—*
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Kreitzberg, Ernest A., to Allis-Chalmers Corporation. Safety lock for articulated joint on vehicle. 4,116,459, Cl. 280-474.000.

Krejci, Milan; and Kresse, Peter, to Bayer Aktiengesellschaft. Production of coated building components. 4,117,197, Cl. 428-443.000.

Kremer, Carl P., Jr.; and Powers, Mark O., to Eastfield Corporation. Mist generator. 4,116,387, Cl. 239-338.000.

Krenzer, John: *See—*
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Kress, Robert W.: *See—*
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Kresse, Peter: *See—*
Krejci, Milan; and Kresse, Peter, 4,117,197, Cl. 428-443.000.

Krezak, John Edward: *See—*
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Krob, Erwin; and Svoboda, Josef, to TMC Corporation. Brake device for skis. 4,116,461, Cl. 280-605.000.

Krogsrud, Harald, to Elkem-Spigerverket A/S. Method of treating wet-washed silica dust. 4,116,830, Cl. 210-63.00R.

Kruer, Melvin R.; Esterowitz, Leon; Bartoli, Filbert J.; and Allen, Roger E., to United States of America, Navy. Room-temperature,

thin-film, PbS photoconductive detector hardened against laser damage. 4,117,329, Cl. 250-338.000.
Kruger, Hermann, to Volkswagenwerk Aktiengesellschaft. Water tank for transverse flow radiator. 4,116,268, Cl. 165-111.000.
Krumkalns, Eriks V., to Eli Lilly and Company. Method of regulating the growth of aquatic weeds with pyridine derivatives. 4,116,665, Cl. 71-66.000.
Krupp, David M.; and Hood, Robert B., to Fairchild Camera and Instrument Corporation. Electronic control system. 4,116,169, Cl. 123-32.0EC.
Kuab Konsult och Utveckling AB: *See*—
Tholen, Bengt Olov; and Hedstrom, Hans Ivar, 4,116,041, Cl. 73-12.000.
Kubens, Rolf: *See*—
Jakob, Hans-Dieter; Kubens, Rolf; and Heine, Heinrich, 4,116,946, Cl. 528-172.000.
Kubota, Ltd.: *See*—
Yamaji, Tadao; Nakajima, Toshi; and Sagara, Takao, 4,116,478, Cl. 285-302.000.
Kubota, Naohiro: *See*—
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Kubota, Tatsushi: *See*—
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Kuhlman, Harvey G. Food forming apparatus. 4,116,119, Cl. 99-450.600.
Kunin, Robert, to Rohm and Haas Company. Regenerant composition and method for regeneration of weak acid cation exchange resin. 4,116,860, Cl. 252-192.000.
Kunze, Dietmar, to Kali und Salz Aktiengesellschaft. Process for the production of highly concentrated magnesium chloride solutions. 4,117,078, Cl. 423-163.000.
Kuraray Co., Ltd.: *See*—
Mori, Fumio; Omura, Yoshiaki; Nishida, Takashi; and Itoi, Kazuo, 4,117,247, Cl. 568-845.000.
Kurita, Hideaki: *See*—
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Kuroda, Ryozo: *See*—
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Kuroda, Yoji: *See*—
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Kurono, Masayasu; Nakai, Hisao; and Muryobayashi, Takashi, to Ono Pharmaceutical Company. 15-Cyclobutyl-prostaglandins. 4,117,119, Cl. 424-180.000.
Kurosaki Refractories Co., Ltd.: *See*—
Horiguchi, Hiroshi; and Matsuo, Terumoto, 4,116,372, Cl. 222-600.000.
Kurrle, Frederick L., to Westvaco Corporation. Composite silicate pigment. 4,117,191, Cl. 428-330.000.
Kusakabe, Hiromi, to Tokyo Shibaura Electric Co., Ltd. Frequency synthesizer tuner. 4,117,407, Cl. 325-455.000.
Kushima, Teizo; Kurita, Takaji; and Mizunoe, Hiroaki, to Minolta Camera Kabushiki Kaisha. Electrophotographic copying apparatus. 4,116,557, Cl. 355-8.000.
Kusic, George: *See*—
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Kuspert, John C.: *See*—
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Kussy, Frank W.; Elmore, Claudius C., Jr.; and Molesworth, Richard E., to Gould Inc. Stationary contact combination. 4,117,290, Cl. 200-243.000.
Kutrieb, Wolfgang A. Oil heater having controlled oil flow. 4,116,614, Cl. 431-89.000.
Kuus, Gijsbert; and de Ridder, Adriaan Jan, to U.S. Philips Corporation. High-pressure discharge lamp. 4,117,369, Cl. 313-178.000.
Kuwada, Yutaka: *See*—
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Kwiecinski, James R., to Westinghouse Electric Corp. Wire coating powder. 4,117,032, Cl. 260-857.0PE.
L.J.N. Toys, Ltd.: *See*—
Dorfman, Steven R., 4,116,443, Cl. 273-95.00R.
La Bate, Michael Donald. Patch material for chuck holes in pavement. 4,116,709, Cl. 106-284.000.
Labaz: *See*—
Descamps, Marcel; and Goldenberg, Charles, 4,117,151, Cl. 424-285.000.
Labor Muszeripari Muvek: *See*—
Takatsy, Gyula; Barb, Katalin; Muranyi, Istvan; and Burda, Ferencne, 4,116,777, Cl. 195-127.000.
Lacchia, Adrien. Electrostatic powder coating apparatus. 4,116,384, Cl. 239-15.000.
Lacher, Rainer: *See*—
Braun, Karl; Lacher, Rainer; and Pfeiffer, Willi, 4,116,200, Cl. 128-305.000.
Lafont, Robert; and Hallot, Louis H., to Regie Nationale des Usines Renault. Method of producing iron. 4,116,678, Cl. 75-11.000.
Lagher, Gunnar: *See*—
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Laib, Lajos; Komandi, Gyorgy; Polyak, Nandor; and Bolyky, Janos, to Csepel Muvek Hiradastechnikai Gepgyara. Engine load-proportional working time measurement. 4,116,051, Cl. 73-116.000.
Lake, Marquis J., Sr.: *See*—
Acre, Sydney R.; and Lake, Marquis J., Sr., 4,116,218, Cl. 137-627.500.
Lambert, Everette M. Lap seam folder and wide width sealer. 4,116,745, Cl. 156-362.000.
Lamelot, Pierre Marie Louis; and Mousson, Roland Georges, to Societe Anonyme de Telecommunications. Infrared deviation measuring device. 4,117,327, Cl. 250-338.000.
Lane, Arlo E. Device for preventing circulation of liquid water entrained in compressed air. 4,116,650, Cl. 55-387.000.
Langemeyer, Carl; and Tetenborg, Konrad, to Windmoller & Holscher. Apparatus for automatically filling and closing sacks. 4,115,978, Cl. 53-570.000.
Langford, William D.; Leuenberger, Dale F.; and Hazlett, Howard A., to Incom International, Inc. Changeable gate plate means for lever control devices. 4,116,086, Cl. 74-532.000.
Langley, John Randolph; and Spritzer, Michael H., to General Atomic Company. Fluidized bed, gas coating apparatus. 4,116,160, Cl. 118-48.000.
Lansiart, Alain; Morucci, Jean-Pierre; and Seigneur, Alain, to Commissariat a l'Energie Atomique. Gamma radiation detector. 4,117,330, Cl. 250-361.00R.
Lant, Lawrence L., to Chem-Farm Inc. Fast clamp chisel trip. 4,116,281, Cl. 172-267.000.
Lantai, Kalman. Method of increasing the yield in the cultivation of tuber-producing plants and a device for carrying out the method. 4,115,950, Cl. 47-58.000.
Lappi, Larry R.: *See*—
Fridinger, Tomas L.; Moore, George G. I.; and Lappi, Larry R., 4,116,676, Cl. 71-103.000.
Large, George B.: *See*—
Gaughan, Edmund J.; and Large, George B., 4,116,668, Cl. 71-88.000.
Larkin, Mark E.; and King, Michael H. Remotely operated gate structure. 4,115,954, Cl. 49-240.000.
Larsen, Ward Orin. Needle valve type pump injector. 4,116,417, Cl. 251-122.000.
Larsson, Karl Olof Axel Helmer. Reefing apparatus for a sailing ship. 4,116,152, Cl. 114-106.000.
Lass, Harold M., to Corban Industries, Inc. Dry wall taping machine having an improved tape shear. 4,116,748, Cl. 156-526.000.
Latta, John S. Light detection and signaling system. 4,117,457, Cl. 340-134.000.
Lauck, John A., to National Machine Company, Inc. Flow sensing auxiliary pump by-pass valve. 4,116,577, Cl. 417-286.000.
Laurizio, Daniel V., to Fluorocarbon Company, The. High temperature slide bearing. 4,116,499, Cl. 308-3.00R.
Lavalley, Roger; Gozlan, Roger; and Brami, Gilbert, to Serpo "Societe d'Etudes et de Recherches pour la protection. Device for automatic signalling of an automotive vehicle damaged by collision. 4,117,450, Cl. 340-52.00H.
Lavertu, Roger: *See*—
Perrault, Guy; Francoeur, Raynald; and Lavertu, Roger, 4,116,734, Cl. 149-19.200.
Lavigna, Robert Joseph: *See*—
Chu, Tze Yao; Jaluria, Yogesh; Lavigna, Robert Joseph; Reusser, Raymond Edward; and Williams, George, 4,116,642, Cl. 422-249.000.
Lavine, Leanelda: *See*—
Lavine, Mortimore; and Lavine, Leanelda, 4,115,906, Cl. 24-72.000.
Lavine, Mortimore; and Lavine, Leanelda. Clippable trouser retaining strap. 4,115,906, Cl. 24-72.000.
Lavrentiev, Alexandr Alexeevich: *See*—
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.
Lawrence Brothers, Inc.: *See*—
Lawrence, Tom M., 4,116,514, Cl. 339-4.000.
Lawrence, Tom M., to Lawrence Brothers, Inc. Security hinge. 4,116,514, Cl. 339-4.000.
Lawson, Ronald; and Watson, David, to Imperial Chemical Industries Limited. Fiber process. 4,115,907, Cl. 28-266.000.
Lazzarotto, Thomas Frank. Sludge filter. 4,116,838, Cl. 210-209.000.
Leanna, Dale D.; Jorgensen, Allen R.; Curro, Thomas R.; and Bray, Andrew M., to Magna-Graphics Corporation. Embossing apparatus

having magnetic roller and flexible embossing plates therefor. 4,116,594, Cl. 425-3.000.

Leblanc, Jacques; Dambier, Gerard; Coron, Noel; and Moalic, Jean-Pierre, to Agence Nationale de Valorisation de la Recherche. Liquid helium-cooled bolometer wherein the sensitive element and the elements linking the latter to the electrical connections are obtained from the same semiconductor body. 4,116,063, Cl. 73-355.00R.

Leboul, Jean: *See*—
Farge, Daniel; Leboul, Jean; Le Goff, Yves; and Poiget, Gilbert, 4,116,974, Cl. 260-332.20A.

Leclerc, Henri: *See*—
Trinel, Pierre-Andre; Leclerc, Henri; and Moschetto, Yves, 4,116,631, Cl. 23-230.00B.

Leclerc, Serge, to Wabco Westinghouse. Spring actuated brake cylinder device with fluid pressure operable release piston lockout means. 4,116,113, Cl. 92-24.000.

Leduc, Arthur J., to Leduc Safety Basket Corporation. Mechanical robe grab. 4,116,305, Cl. 182-3.000.

Leduc Safety Basket Corporation: *See*—
Leduc, Arthur J., 4,116,305, Cl. 182-3.000.

Lee, Chi-Long: *See*—
Elias, Janet L.; Lee, Chi-Long; and Maxson, Myron T., 4,116,919, Cl. 260-37.0SB.

Lee, John M.; and Bauman, William C., to Dow Chemical Company, The. Recovery of lithium from brines. 4,116,856, Cl. 252-184.000.

Lee, John M.; and Bauman, William C., to Dow Chemical Company, The. Recovery of Mg^{++} from brines. 4,116,857, Cl. 252-184.000.

Lee, John M.; and Bauman, William C., to Dow Chemical Company, The. Recovery of lithium from brines. 4,116,858, Cl. 252-184.000.

Lee, Lester T. C.: *See*—
Chlanda, Frederick P.; Lee, Lester T. C.; and Liu, Kang-Jen, 4,116,889, Cl. 521-27.000.

Lee, Warren C.: *See*—
Fuhr, Arlan W.; and Lee, Warren C., 4,116,235, Cl. 128-69.000.

Leesona Corporation: *See*—
Dudzik, Chester John, 4,115,990, Cl. 57-140.00R.

Le Goff, Yves: *See*—
Farge, Daniel; Leboul, Jean; Le Goff, Yves; and Poiget, Gilbert, 4,116,974, Cl. 260-332.20A.

LeGrand, Richard Webster, to Hercules Incorporated. Thread forming and neck finishing apparatus. 4,116,607, Cl. 425-525.000.

Leheu, Jacques: *See*—
Boy Marcotte, Jean-Louis; Chevalier, Georges; Gerij, Janusz; and Leheu, Jacques, 4,116,765, Cl. 176-38.000.

Lehmann, Hans; and Zondler, Helmut, to Ciba-Geigy Corporation. Storable, rapidly hardening epoxy resin adhesive. 4,117,038, Cl. 260-837.00R.

Lehmann, Rolf; and Christ, Alfred, to Escher Wyss GmbH. Apparatus for the production of flakes from granular products. 4,116,601, Cl. 425-324.100.

Lehmann, Werner; Purr, Horst; and Raible, Herrmann, to Mathias Bauerle GmbH. Device for controlling a washing liquid level in a wash tank of a printing machine. 4,116,128, Cl. 101-425.000.

Lehn, Jean-Marie; Schue, Francois; Boileau, Sylvia; Kaempf, Bernd; Cau, Alain Andre; Moinard, Jean Robert; and Raynal, Serge Fernand, to Societe Nationale des Poudres et Explosifs. Antionic polymerization. 4,116,887, Cl. 260-2.00A.

Lehnen, Josef: *See*—
Koch, Heinrich; and Lehnen, Josef, 4,117,073, Cl. 264-349.000.

Leibowitz, Marshall, to Timex Corporation. Electrochromic device with cationic ion exchange resin separator. 4,116,546, Cl. 350-356.000.

Leikhim, John William, to Procter & Gamble Company, The. Thickened bleach compositions for treating hard-to-remove soils. 4,116,849, Cl. 252-103.000.

Leikhim, John William: *See*—
Rupe, Lewis Allen; Tuthill, Lyle Brown; and Leikhim, John William, 4,116,851, Cl. 252-103.000.

Leimbach, Richard C., to Eaton Corporation. Combination tire pressure monitoring switch and inflation valve. 4,117,281, Cl. 200-61.250.

Lein, Werner: *See*—
Forster, Karl-Heinz; and Lein, Werner, 4,116,125, Cl. 101-212.000.

Leitner, Robert: *See*—
Deutscher, Fritz; and Leitner, Robert, 4,116,878, Cl. 252-94.000.

Leland Stanford Junior University, The Board of Trustees of the: *See*—
Johnson, William S.; and Bartlett, Paul A., 4,117,234, Cl. 560-107.000.

Leman, Jeffrey Donald; and Robertson, Allan James, to American Cyanamid Company. Fire retardant wood products. 4,117,200, Cl. 428-526.000.

Lemons, Ross Alan: *See*—
Coldren, Larry Allen; Glass, Alastair Malcolm; and Lemons, Ross Alan, 4,117,424, Cl. 333-30.00R.

Leneuf, Andre, to Manufacture de Produits Chimiques Protex. Hydroxy-containing agents for chelating metal ions and a process for preparing same. 4,116,991, Cl. 260-439.00R.

Lengyel, Sandor: *See*—
Horvath, Laszlo; Major, Ferenc; Gaal, Otto; and Lengyel, Sandor, 4,116,328, Cl. 198-648.000.

Lennington, John W.: *See*—
McDougal, John A.; and Lennington, John W., 4,116,173, Cl. 123-117.00R.

Lentz, James A.; and Safford, George J., to Xerox Corporation. Compositions and method for enhancing electrical life of copolymers. 4,116,894, Cl. 521-94.000.

Lenzen, Glenn H., Jr.: *See*—
Earle, Michael; and Lenzen, Glenn H., Jr., 4,117,302, Cl. 219-121.0LM.

Leonard, Vernon Leon: *See*—
Saxon, Daniel Isaiah; and Leonard, Vernon Leon, 4,115,908, Cl. 28-269.000.

Leonhard, Kurt: *See*—
Lohr, Joachim; Bauer, Friedrich; and Leonhard, Kurt, 4,116,172, Cl. 123-52.00M.

Leopold, Leo. Folding liner for shirts and other packaged garments. 4,116,335, Cl. 206-492.000.

Lese, Henri K.: *See*—
Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, 4,116,817, Cl. 208-210.000.
Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, 4,116,818, Cl. 208-210.000.
Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, 4,116,819, Cl. 208-216.000.

Lesea, Ronald A., to Candela Electronics, Inc. Telephone answering and call diverting system. 4,117,270, Cl. 179-18.0BE.

Leto, Alfred R.: *See*—
Belmuth, Harold M.; Leto, Alfred R.; London, Lawrence; and Zuckerman, Herman A., 4,115,938, Cl. 40-152.000.

Leuenberger, Dale F.: *See*—
Langford, William D.; Leuenberger, Dale F.; and Hazlett, Howard A., 4,116,086, Cl. 74-532.000.

Levandoski, Raymond Alexander: *See*—
Hudson, James Alphus, Jr.; Levandoski, Raymond Alexander; and Long, Allen Kyle, 4,117,398, Cl. 324-61.00R.

Lever Brothers Company: *See*—
Bradshaw, Noel James; Savage, David; and Sneath, Michael Edwin, 4,117,172, Cl. 426-276.000.
Deutscher, Fritz; and Leitner, Robert, 4,116,878, Cl. 252-94.000.

Leverenz, Melvin E., to Diamond Crystal Salt Company. Salt dissolver. 4,116,640, Cl. 422-264.000.

Levine, Michael R. Computer assisted display processor having memory sharing by the computer and the processor. 4,117,469, Cl. 340-324.0AD.

Levinos, Steven, to Keuffel & Esser Company. Photo-imaging utilizing alkali-activated photopolymerizable compositions. 4,116,693, Cl. 96-35.100.

Levy, Norman: *See*—
Eisenberg, Melvin I.; Levy, Norman; and Beall, Glenn L., 4,116,227, Cl. 128-2.00F.

Lewis, Barry J.; Kuspert, John C.; Saunders, Arthur G.; and McAusland, Robert R., to Norfin, Inc. Sheet binding apparatus. 4,116,750, Cl. 156-563.000.

Lewis, Edward Lloyd, to Elliott Brothers (London) Limited. Method for making optical-fibre cables. 4,116,655, Cl. 65-4.00B.

Lewis, Howard A.: *See*—
Coberly, Charles W.; and Lewis, Howard A., 4,116,523, Cl. 339-108.0TP.

Lezgintsev, Georgy Mikhailovich; Istoshin, Stanislav Jurievich; Belyavsky, Mikhail Anatolievich; Kontar, Evgeny Alexeevich; Koptyazhin, Nikolai Nikolaevich; Agaltsov, Georgy Ivanovich; Chernov, Boris Serafimovich; Ter-Saakov, Eduard Isaakovich; and Shkatov, Evgeny Petrovich. Device for taking bottom soil samples from deep water basins. 4,116,069, Cl. 73-425.200.

Li, Choh Hao, to Hoffmann-La Roche Inc. Analogs of human β-endorphin. 4,116,950, Cl. 260-112.50R.

Li, George S.; and Rosen, Irving, to Standard Oil Company, The. Thermoplastic resin blends containing polyindene or coumarone-indene resin. 4,117,040, Cl. 260-899.000.

Li, George S., to Standard Oil Company, The. High softening maleic anhydride copolymers. 4,117,218, Cl. 526-272.000.

Liakumovich, Alexandr Grigorievich: *See*—
Abramov, Ivan Egorovich; Gershanov, Felix Borisovich; Dolidze, Vladimir Romanovich; Zakharova, Nina Vasilievna; Liakumovich, Alexandr Grigorievich; Michurov, Jury Ivanovich; Popov, Vasily Dmitrievich; Rutman, Grigory Iosifovich; and Shalimova, Zoya Stepanovna, 4,117,244, Cl. 568-799.000.

Libbey-Owens-Ford Company: *See*—
Revells, Robert G., 4,116,662, Cl. 65-289.000.

Libby, Edwin L.; and Miller, Myrl J., to International Business Machines. Optical system featuring change in magnification by combined lens and mirror motion. 4,116,562, Cl. 355-60.000.

Libby, Edwin Langford; and Miller, Myrl J., to International Business Machines Corporation. Optical reduction system featuring the provision of borders. 4,116,554, Cl. 355-11.000.

Liberman, Harvey W.; Goranson, Paul L.; Ratledge, R. Houston, Jr.; and Salyers, John C., to Carrier Corporation. Methods for loading refuse. 4,116,121, Cl. 100-39.000.

Licht, Lazar, to United Technologies Corporation. Resilient foil thrust bearings. 4,116,503, Cl. 308-9.000.

Lichtblau, George Jay. Beat frequency interference rejection circuit. 4,117,466, Cl. 340-501.000.

Liebert, Timothy C.; and McClintock, William A., to Phillips Petroleum Company. Process for purifying diolefin. 4,117,025, Cl. 260-681.500.

Liebi, Harald: *See*—
Zaugg, Hans; and Liebi, Harald, 4,116,221, Cl. 126-271.000.

Liesener, Kenneth P., to Caterpillar Tractor Co. Load plus differential

pressure compensator pump control assembly. 4,116,587, Cl. 417-212.000.

Lietz, Dennis E.; and Kinney, Layton F., to P.R.A. Laboratories Incorporated. Alkyd-supported emulsion interpolymers and methods for preparation. 4,116,903, Cl. 260-22.0CB.

Liggett Group Inc.: *See—*
Hall, Floyd Van, 4,116,602, Cl. 425-354.000.

Lilienthal, Clarence D.: *See—*
Kintigh, Stanley S.; and Lilienthal, Clarence D., 4,117,392, Cl. 323-21.000.

Lilja, E. Harold: *See—*
Porth, Chris H.; and Lilja, E. Harold, 4,115,957, Cl. 51-170.0EB.

Lillig, John E.; Meyer, Richard C.; and Anderson, Robert J., to Beckman Instruments, Inc. Signal conditioning circuit. 4,117,414, Cl. 330-149.000.

Limbach, Walter S., II; and Kusic, George, to Automation Equipment Inc. Tracer control circuit. 4,117,385, Cl. 318-578.000.

Lindahl, Sven: *See—*
Lindgren, Ake; and Lindahl, Sven, 4,116,603, Cl. 425-370.000.

Linde AG.: *See—*
Oberpriller, Jakob, 4,116,017, Cl. 62-62.000.

Linde Aktiengesellschaft: *See—*
Stockner, Josef; and Wildmoser, Alfred, 4,117,048, Cl. 261-93.000.

Linder, Ernst; and Thut, Kurt, to Osterwalder AG. Hydraulic driven press. 4,116,122, Cl. 100-48.000.

Lindgren, Ake; and Lindahl, Sven, to Aktiebolaget Carl Munters. Apparatus for corrugating a web of sheet material. 4,116,603, Cl. 425-370.000.

Lindo, Neil A.: *See—*
Zinnes, Harold; Lindo, Neil A.; and Shavel, John, Jr., 4,116,964, Cl. 260-294.80C.

Lindwall, Conny Holger: *See—*
Appelquist, Jan Olov; and Lindwall, Conny Holger, 4,117,294, Cl. 219-10.55C.

Linfield, Warner M.: *See—*
Bistline, Raymond G., Jr.; Linfield, Warner M.; and Noble, Wilfred R., 4,116,986, Cl. 260-401.000.

Linsi, Ulrich: *See—*
Horler, Hansulrich; Linsi, Ulrich; and Policke, Oswald, 4,116,502, Cl. 308-9.000.

Lion Oil Company: *See—*
Tarver, Gilbert W.; and Koons, Russell E., 4,116,708, Cl. 106-281.00R.

Liou Tchen San, Rene. Tamper resistant alarm annunciator. 4,117,467, Cl. 340-506.000.

Lipp, Eberhard: *See—*
Lodige, Wilhelm; Lodige, Fritz; Lucke, Josef; and Lipp, Eberhard, 4,117,223, Cl. 536-99.000.

Lipschutz, Paul, to Neiman S.A. Anti-theft device for machines equipped with a diesel or like engine. 4,116,024, Cl. 70-201.000.

Litecraft Pty. Ltd.: *See—*
Drower, Wilfred, 4,116,460, Cl. 280-478.00R.

Liu, Kang-Jen: *See—*
Chlanda, Frederick P.; Lee, Lester T. C.; and Liu, Kang-Jen, 4,116,889, Cl. 521-27.000.

Lockheed Corporation: *See—*
Jones, Lamar J.; and Williams, Carl W., 4,116,400, Cl. 242-67.10R.

Lodige, Fritz: *See—*
Lodige, Wilhelm; Lodige, Fritz; Lucke, Josef; and Lipp, Eberhard, 4,117,223, Cl. 536-99.000.

Lodige, Wilhelm; Lodige, Fritz; Lucke, Josef; and Lipp, Eberhard. Process for the preparation of cellulose alkyl ethers. 4,117,223, Cl. 536-99.000.

Loewe, Werner; and Striebel, Heini Paul, to Ciba-Geigy AG. Anthelmintic preparations. 4,117,156, Cl. 424-302.000.

Logan, James H., to General Electric Company. Hybrid deflection system with quadripolar correction coils. 4,117,434, Cl. 335-213.000.

Lohmann, Frank: *See—*
Rohringer, Peter; Lohmann, Frank; and Wurster, Rudolf F., 4,116,702, Cl. 106-15.0FP.

Lohr & Bromkamp GmbH: *See—*
Aucktor, Erich; and Rubin, Wolfgang, 4,116,020, Cl. 64-21.000.
Welschof, Hans-Heinrich, 4,116,019, Cl. 64-17.00A.

Lohr, Joachim; Bauer, Friedrich; and Leonhard, Kurt, to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft. Naturally aspirated eight cylinder internal combustion engine. 4,116,172, Cl. 123-52.00M.

London, Lawrence: *See—*
Belmuth, Harold M.; Leto, Alfred R.; London, Lawrence; and Zuckerman, Herman A., 4,115,938, Cl. 40-152.000.

Long, Allen Kyle: *See—*
Hudson, James Alphus, Jr.; Levandoski, Raymond Alexander; and Long, Allen Kyle, 4,117,398, Cl. 324-61.00R.

Long, Delmar D., to M. Lowenstein & Sons, Inc. Substrate passes through pool confining wall coating apparatus. 4,116,159, Cl. 118-34.000.

Long, William J., to United States Gypsum Company. Starch-coated paper and gypsum wallboard prepared therewith. 4,117,183, Cl. 428-201.000.

Longley, Kermit D.; and Karalis, Anastasios J., to Witco Chemical Corporation. Unsymmetrical sulfosuccinate diesters. 4,117,237, Cl. 560-151.000.

Lonza, Ltd.: *See—*
Hardt, Peter, 4,116,968, Cl. 260-290.00V.

Loomskill, Inc.: *See—*
Wolpert, Stanley, 4,115,937, Cl. 35-55.000.

Lopata, Karl Peter; and Schiffer, Gunter, to Kleinewefers Industrie-Companie GmbH. Device for printing on webs of textile material. 4,116,022, Cl. 68-5.00D.

Love, Robert Bruce; and Bowen, Alan W., to Battelle Development Corporation. Two-sided planar magnetron sputtering apparatus. 4,116,806, Cl. 204-298.000.

Love, William W., to Brandt Company, The. Method and apparatus for continuously separating lost circulating material from drilling fluid. 4,116,288, Cl. 175-66.000.

Lowndes Engineering Co., Inc.: *See—*
Waldron, David W., 4,116,385, Cl. 239-77.000.

Luborsky, Fred E.: *See—*
Becker, Joseph J.; Luborsky, Fred E.; Jacobs, Israel S.; and McCary, Richard O., 4,116,728, Cl. 148-108.000.

Lubov, Donald S., to Georight Industries, Inc. Building module. 4,115,963, Cl. 52-81.000.

Lubrizol Corporation, The: *See—*
Jahnke, Richard William, 4,116,872, Cl. 252-32.70E.

Lucas Industries Limited: *See—*
Hodgson, Duncan Barry; Thornton, John Robert; and Rose, Jonathan, 4,117,453, Cl. 340-76.000.
Mardell, John Edward, 4,116,591, Cl. 417-417.000.
Phillips, Ronald; and Melville, James Campbell, 4,116,588, Cl. 417-252.000.

Lucas, Richard C.: *See—*
Hornak, Thomas; and Lucas, Richard C., 4,117,347, Cl. 307-221.00D.

Lucke, Josef: *See—*
Lodige, Wilhelm; Lodige, Fritz; Lucke, Josef; and Lipp, Eberhard, 4,117,223, Cl. 536-99.000.

Ludwig, Frank A., to Ford Motor Company. Electrical conversion device with ceramic electrode. 4,117,208, Cl. 429-104.000.

Lueders, Arthur L.: *See—*
Kim, Raymond W. H.; Lueders, Arthur L.; Prelletz, Edward R.; and Warden, Gerald D., 4,116,551, Cl. 352-124.000.

Luk Lamellen und Kupplungsbau GmbH: *See—*
Maucher, Paul, 4,116,313, Cl. 192-3.630.

Lukens Steel Company: *See—*
Joshi, Satish Vishwanath; and Bracher, Douglas Lee, 4,116,690, Cl. 75-257.000.

Lukicheva, Natalya Ivanovna: *See—*
Maslov, Vadim Nikolaevich; Korobov, Oleg Evgenievich; Lupacheva, Alla Naumovna; Vlasov, Alexandr Nikolaevich; Myasoedov, Viktor Vasilievich; Bochkarev, Ellin Petrovich; Gimelfarb, Felix Aronovich; Bronshtein, Izidor Karlovich; Lukicheva, Natalya Ivanovna; Sinitsyn, Evgeny Vladimirovich; Sokurenko, Jury Varnavovich; Jurova, Elena Sergeevna; Kistova, Elena Mikhailovna; Konstantinova, Marina Andreevna; and Samaginov, Veniamin Mikhailovich, 4,117,504, Cl. 357-16.000.

Lummus Company, The: *See—*
Barchas, Richard K., 4,116,999, Cl. 260-465.00H.
Gelbein, Abraham P.; and Sze, Morgan C., 4,116,967, Cl. 260-295.50R.

Lundeen, Allan J.: *See—*
Starks, Charles M.; and Lundeen, Allan J., 4,117,243, Cl. 568-744.000.

Lupacheva, Alla Naumovna: *See—*
Maslov, Vadim Nikolaevich; Korobov, Oleg Evgenievich; Lupacheva, Alla Naumovna; Vlasov, Alexandr Nikolaevich; Myasoedov, Viktor Vasilievich; Bochkarev, Ellin Petrovich; Gimelfarb, Felix Aronovich; Bronshtein, Izidor Karlovich; Lukicheva, Natalya Ivanovna; Sinitsyn, Evgeny Vladimirovich; Sokurenko, Jury Varnavovich; Jurova, Elena Sergeevna; Kistova, Elena Mikhailovna; Konstantinova, Marina Andreevna; and Samaginov, Veniamin Mikhailovich, 4,117,504, Cl. 357-16.000.

Lupkas, Raymond R. Solar energy collection device. 4,116,224, Cl. 126-271.000.

Luttrell, Richard W.; and Purcell, Robert J., to Caterpillar Tractor Co. Sprocket profile. 4,116,081, Cl. 74-243.00R.

Lutz, Erno B., to Solfan Systems, Inc. Microwave motion-detection apparatus employing a Gunn oscillator in a self-detecting mode. 4,117,464, Cl. 340-554.000.

Luzsicza, Steven O.: *See—*
Snyder, Daniel S.; Luzsicza, Steven O.; and Pauer, Lyle A., 4,117,452, Cl. 340-58.000.

Luzzi, John J.: *See—*
Ramey, Chester E.; and Luzzi, John J., 4,116,933, Cl. 260-45.75N.

Lyalin, Vladimir Nikolaevich: *See—*
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.

M. Lowenstein & Sons, Inc.: *See—*
Long, Delmar D., 4,116,159, Cl. 118-34.000.

Maas, Edward T., Jr., to Exxon Research & Engineering Co. Process for increasing the reaction rate of UO_2F_2. 4,117,083, Cl. 423-253.000.

Maas, Edward T., Jr., to Exxon Research & Engineering Co. Process for producing UO_2F_2. 4,117,084, Cl. 423-253.000.

Macenka, Johannes; Fischer, Manfred; and Gohlke, Fritz Joachim, to Hoechst Aktiengesellschaft. Crude oil demulsifiers. 4,117,031, Cl. 260-838.000.

Machida, Hazime; Tamura, Hiroshi; and Murakami, Kakuji, to Ricoh Co., Ltd. Ferrocyanate treating liquid for offset master. 4,116,698, Cl. 106-2.000.

Machigin, Stanislav Pavlovich: *See*—
Bulychev, Gennady Alexeevich; Bykovsky, Anatoly Vladimirovich; Machigin, Stanislav Pavlovich; and Strelkov, Konstantin Sergeevich, 4,116,056, Cl. 73-147.000.

Macier, Robert Raymond: *See*—
Gilbert, Kendall E.; Johnson, Daniel; and Macier, Robert Raymond, 4,115,998, Cl. 60-39.09R.

Mack, Richard B.: *See*—
Gorr, Benjamin B.; and Mack, Richard B., 4,117,485, Cl. 343-18.00E.

Mackey, Lindsay Joan: *See*—
Jarrett, William Fleming Hoggan; Jarrett, James Oswald; and Mackey, Lindsay Joan, 4,117,112, Cl. 424-89.000.

Maclaren, Owen F., to Gannet Holdings Limited. Baby carriages. 4,116,465, Cl. 280-647.000.

MacLennan, Alexander G., to Charles Stark Draper Laboratory, Inc., The. Torqueless relatively moving transformer windings. 4,117,436, Cl. 336-65.000.

MacMillen, Kenneth T. Method of retreading a tire utilizing an annular sealing gap. 4,117,053, Cl. 264-36.000.

Maeda, Kiyoto: *See*—
Hisada, Yoshio; Maeda, Kiyoto; and Agui, Hideo, 4,117,136, Cl. 424-258.000.

Maessen, Hendrikus J. G.: *See*—
Balg, Theodorus; Cramers, Constant M. A.; and Maessen, Hendrikus J. G., 4,117,000, Cl. 260-465.100.

Magar, Ingrid Joan; and Morris, Patrick Evan, to International Nickel Company, Inc., The. Reference electrode for use at high temperatures and pressures. 4,116,798, Cl. 204-195.00F.

Magna-Graphics Corporation: *See*—
Leanna, Dale D.; Jorgensen, Allen R.; Curro, Thomas R.; and Bray, Andrew M., 4,116,594, Cl. 425-3.000.

Magnaflux Corporation: *See*—
Strauts, Eric J., 4,117,334, Cl. 250-402.000.

Magnall, Anthony N.; Taylor, Philip H.; and Roberts, Fred, to TBA Industrial Products Ltd. Asbestos products. 4,115,991, Cl. 57-153.000.

Magner, Richard G.: *See*—
Powell, William E.; and Magner, Richard G., 4,116,565, Cl. 356-105.000.

Magnusson, Alan B.: *See*—
Dieck, Ronald L.; Garrett, Thomas B.; and Magnusson, Alan B., 4,116,891, Cl. 521-89.000.

Maillefer, Charles: *See*—
Swarbrick, Peter; Green, William John; and Maillefer, Charles, 4,117,195, Cl. 428-379.000.

Maj Andersson Arkitektkontor AB: *See*—
Andersson, Maj; and Lagher, Gunnar, 4,116,377, Cl. 236-12.00A.

Major, Ferenc: *See*—
Horvath, Laszlo; Major, Ferenc; Gaal, Otto; and Lengyel, Sandor, 4,116,328, Cl. 198-648.000.

Major, Rodney Victor, to Telcon Metals Limited. Magnetical soft alloys with good mechanical properties. 4,116,727, Cl. 148-31.550.

Majumdar, Asit, to Pioneer Industries, Div. of Core Industries Inc. Frame and seal assembly. 4,115,968, Cl. 52-204.000.

Maki, Masao: *See*—
Shibata, Tsuneo; Maki, Masao; Suzuki, Masao; and Kawabe, Hidehiko, 4,116,881, Cl. 252-440.000.

Makinson, George Kenneth; and Schofield, David, to Imperial Chemical Industries Limited. Preparation of esters of m-phenoxybenzyl alcohol and its α-cyano and α-ethinyl derivatives with 2,2-dimethylcyclopropanecarboxylic acids. 4,116,998, Cl. 260-465.00D.

Malak, Stephen P. Shaft aligner. 4,115,925, Cl. 33-181.00R.

Malarsky, Frank. Dent puller. 4,116,035, Cl. 72-389.000.

Malec, Robert E., to Ethyl Corporation. Additives. 4,117,011, Cl. 260-570.50P.

Maliszewski, Thomas Arthur: *See*—
Foster, Robert Dean; Maliszewski, Thomas Arthur; Sims, Joseph Alton, Jr.; and Taylor, Glenn Alfred, 4,117,250, Cl. 568-858.000.

Mallek, Heinz; Jablonski, Werner; and Pelzer, Peter, to Kernforschungsanlage Julich, Gesellschaft mit beschrankter Haftung. Method of and furnace for burning waste material. 4,116,136, Cl. 110-251.000.

Malloy, Paul L.: *See*—
O'Farrell, Charles P.; Malloy, Paul L.; and Thompson, Francis M., 4,117,186, Cl. 428-265.000.

Malm, Curtis Lawrence: *See*—
Reed, Meuriel Francis; and Malm, Curtis Lawrence, 4,116,569, Cl. 401-216.000.

Manabe, Masao: *See*—
Abe, Nobuyuki; Watanabe, Osamu; Nunokawa, Koji; Tanaka, Ichiro; and Manabe, Masao, 4,116,012, Cl. 405-238.000.

Manabe, Takao, to Toshiba Kikai Kabushiki Kaisha. Programming systems for automatic sewing machines. 4,116,143, Cl. 112-121.110.

Mangless, Vernon W., to Allis-Chalmers Corporation. Tiltable cab mounting. 4,116,484, Cl. 296-28.00C.

Mansfield, Donald Longworth; and Woodward, Walter Ray, to USM Corporation. Rotor for stepping motor. 4,117,356, Cl. 310-49.00R.

Manufacture de Produits Chimiques Protex: *See*—
Leneuf, Andre, 4,116,991, Cl. 260-439.00R.

Maracic, Mirko. Self-adjusting wind machine. 4,116,585, Cl. 416-41.000.

Marconi Company Limited, The: *See*—
Wilson, William George Moore; and Stewart, Douglas Edward, 4,117,331, Cl. 250-334.000.

Mardell, John Edward, to Lucas Industries Limited. Fuel injection pumps. 4,116,591, Cl. 417-417.000.

Marjoran, Michael J.: *See*—
Winchester, Roy E.; Marjoran, Michael J.; and O'Brien, Roger, 4,116,430, Cl. 271-177.000.

Markin, Trevor Leslie; Bones, Roger John; Scott, Keith Taylor; May, Geoffrey John; and Robinson, Graham, to Chloride Silent Power Limited. Electrochemical cells. 4,117,209, Cl. 429-104.000.

Marks, Cedric. Bottle with a multiple part label. 4,115,939, Cl. 40-310.000.

Marlowe, Frank Jerome; and Anderson, Charles Hammond, to RCA Corporation. Modular type guided beam flat display device. 4,117,368, Cl. 313-422.000.

Marra, Dorothea C.: *See*—
Spitzer, Joseph George; Small, Marvin; Osipow, Lloyd I.; and Marra, Dorothea C., 4,116,370, Cl. 222-402.180.

Marsh, Harold E., Jr.: *See*—
Shafer, John I.; and Marsh, Harold E., Jr., 4,116,131, Cl. 102-103.000.

Marshall, Arthur N., to Traffic Safety Systems, Inc. System of communications to alert police personnel of trouble on expressways. 4,117,404, Cl. 325-1.000.

Marshall, Vincent P.; Elrod, David W.; Koert, James M.; Reisender, Elizabeth A.; and Wiley, Paul F., to Upjohn Company, The. Process for preparing 7-deoxysteffimycinol. 4,116,769, Cl. 195-51.00R.

Marsili, Leonardo: *See*—
Rossetti, Vittorio; Marsili, Leonardo; and Pasqualucci, Carmine, 4,116,957, Cl. 260-239.30P.

Martel, Charles Simeon; Papillon, Jean-Guy; and Papillon, Paul. Wall system. 4,115,980, Cl. 52-591.000.

Marten, Hilda C. Register tape editor. 4,116,468, Cl. 281-7.000.

Martin, Anthony Newman; Buczek, Carl James; and Mongeon, Robert Joseph, to United Technologies Corporation. Engine control system. 4,116,000, Cl. 60-242.000.

Martin, Anthony Newman: *See*—
Walworth, Kirk Sumner; and Martin, Anthony Newman, 4,117,460, Cl. 340-190.000.

Martin, Dallas James, to Western Geophysical Co. of America. T-bar base plate for a seismic signal transducer. 4,116,299, Cl. 181-113.000.

Martin, David Michael: *See*—
Greer, Raymond Thomas; Vale, Bradley Harold; and Martin, David Michael, 4,117,323, Cl. 250-311.000.

Martin, John Frederick: *See*—
Graham, Gordon Judson; Martin, John Frederick; and Crowell, Douglas Hodgen, 4,116,097, Cl. 83-155.000.

Martinez, Louis. Narrow-band radio communication system. 4,117,405, Cl. 325-58.000.

Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich. Tubular coiled heat excha..ger and device for manufacturing same. 4,116,270, Cl. 165-162.000.

Marusiak, Frank, Jr., to Raymond Lee Organization, Inc., The, a part interest. Radiator concealing article of furniture. 4,116,507, Cl. 312-210.000.

Marvel Specialty Company: *See*—
Harrill, John D., 4,116,021, Cl. 66-149.00S.

Marvin Glass & Associates: *See*—
Breslow, Jeffrey D., 4,116,449, Cl. 273-240.000.

Marvin, Mason D.: *See*—
Boerstler, Leslie H.; Discenza, Walter V., Jr.; Marvin, Mason D.; and Ebersole, Theodore J., 4,117,344, Cl. 290-52.000.

Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft: *See*—
Lohr, Joachim; Bauer, Friedrich; and Leonhard, Kurt, 4,116,172, Cl. 123-52.00M.
Motz, Karl; Meyer, Josef; and Schurrer, Josef, 4,116,501, Cl. 308-9.000.

Mascioli, Rocco L.: *See*—
Bechara, Ibrahim S.; Carroll, Felix P.; Mascioli, Rocco L.; and Panchak, John R., 4,116,879, Cl. 252-426.000.

Mashkovsky, Mikhail Davydovich; Yakhontov, Leonid Nikolaevich; Ado, Andrei Dmitrievich; Kaminka, Mikhail Emmanuilovich; Mikhlina, Eva Evseevna; Vorobieva, Valentina Yakovlevna; Yanina, Anna Dmitrievna; and Komarova, Nadezhda Andreevna. Medicated compound for treating allergic diseases. 4,117,139, Cl. 424-267.000.

Maslov, Vadim Nikolaevich; Korobov, Oleg Evgenievich; Lupacheva, Alla Naumovna; Vlasov, Alexandr Nikolaevich; Myasoedov, Viktor Vasilievich; Bochkarev, Ellin Petrovich; Gimelfarb, Felix Aronovich; Bronshtein, Izidor Karlovich; Lukicheva, Natalya Ivanovna; Sinitsyn, Evgeny Vladimirovich; Sokurenko, Jury Varnavovich; Jurova, Elena Sergeevna; Kistova, Elena Mikhailovna; Konstantinova, Marina Andreevna; and Samaginov, Veniamin Mikhailovich. Heterogeneous semiconductor structure with composition gradient and method for producing same. 4,117,504, Cl. 357-16.000.

Massachusetts Institute of Technology: *See—*
Baker, Richard H., 4,117,364, Cl. 318-230.000.
Hong, Henry Y-P, 4,117,103, Cl. 423-593.000.
Massey-Ferguson Services N.V.: *See—*
Todeschini, Eugenio; and Riganti, Gian Piero, 4,116,292, Cl. 180-6.480.
Masuda, Akio, to Alps Shoji Co., Ltd. Movable toy having gear disengaging mechanism and gear changing mechanism. 4,116,084, Cl. 74-342.000.
Masuda, Hidemi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Device for suspending an exhaust pipe in vehicles. 4,116,411, Cl. 248-60.000.
Masuda, Noboru; Nishino, Yu; and Kase, Hiroaki, to Denki Onkyo Co., Ltd. Magnetic sensor having a hollow housing sealed with a shield cap. 4,117,523, Cl. 360-110.000.
Matesa, Joseph Michael; and Rau, Frank John, to PPG Industries, Inc. Apparatus and method for circulating molten metal in a bath used in the manufacture of glass. 4,116,659, Cl. 65-99.00A.
Mathbirk Limited: *See—*
Matthews, Denis, 4,116,146, Cl. 112-217.200.
Matthews, Denis, 4,116,147, Cl. 112-217.100.
Mathe, George L.; and Osmalov, Jerome S., to Philip Morris Incorporated. Method for twisting strip material. 4,117,064, Cl. 264-103.000.
Mathias Bauerle GmbH: *See—*
Lehmann, Werner; Purr, Horst; and Raible, Herrmann, 4,116,128, Cl. 101-425.000.
Mathias, Eckart, to W. R. Grace & Co. Photocurable imidizable polyene-polythiol compositions. 4,117,196, Cl. 428-379.000.
Mathis Fertigputz GmbH: *See—*
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Mathis, Paul; and Zimmer, Max, to Mathis Fertigputz GmbH. Apparatus for the preparation of mortar or the like. 4,117,547, Cl. 366-17.000.
Matson, Lawrence W., Jr.: *See—*
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Matsubara, Kunio: *See—*
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Matsuda, Hiroshi: *See—*
Takahashi, Yuzo; Wazima, Yoshimi; Nakada, Akira; Tanaka, Yasuyuki; Nagai, Katsumi; Takahashi, Nobuo; Matsuda, Hiroshi; Aizawa, Eizi; and Oyama, Shiro, 4,117,188, Cl. 428-36.000.
Matsumoto, Seiji; and Fukai, Kiyoshi, to Sakai Chemical Industry Co., Ltd. Production of single crystalline ferrite particles. 4,116,752, Cl. 156-624.000.
Matsumoto, Tadayuki: *See—*
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Matsunaga, Takayoshi: *See—*
Shiohara, Tomoo; Matsunaga, Takayoshi; and Horioka, Mikihiko, 4,116,907, Cl. 260-23.0XA.
Matsuo, Satoshi, to Tokyo Shibaura Electric Co., Ltd. Living body function measuring apparatus. 4,116,231, Cl. 128-2.10Z.
Matsuo, Terumoto: *See—*
Horiguchi, Hiroshi; and Matsuo, Terumoto, 4,116,372, Cl. 222-600.000.
Matsushige, Seiichi: *See—*
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Matsushita Electric Industrial Co., Ltd.: *See—*
Kajino, Jirou; and Iwasaki, Kazumi, 4,117,520, Cl. 360-95.000.
Koyanagi, Yukio, 4,117,476, Cl. 340-347.0DA.
Ohta, Yoshio; Matsuura, Toshiro; and Nakabe, Ryuhei, 4,117,510, Cl. 358-44.000.
Shibata, Tsuneo; Maki, Masao; Suzuki, Masao; and Kawabe, Hidehiko, 4,116,881, Cl. 252-440.000.
Shioyama, Tadao; and Koda, Minoru, 4,117,519, Cl. 360-84.000.
Terui, Yasuaki; and Yoshino, Masaru, 4,117,514, Cl. 358-213.000.
Tsunoo, Masahiko; Hirose, Namio; Kimura, Takeji; Inoue, Michihiro; and Sato, Masaharu, 4,116,102, Cl. 84-1.220.
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Matsuyama, Akira, to Figaro Giken Co., Ltd. Method of completely oxidizing carbon monoxide. 4,117,082, Cl. 423-247.000.
Matthews, Denis, to Mathbirk Limited. Sewing machines. 4,116,146, Cl. 112-217.200.
Matthews, Denis, to Mathbirk Limited. Sewing machines. 4,116,147, Cl. 112-217.100.
Matthews, Russell Byron, to Johnson Controls, Inc. Direct ignition system with interlock protection. 4,116,613, Cl. 431-78.000.
Mau, Theodore A.: *See—*
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Maucher, Paul, to Luk Lamellen und Kupplungsbau GmbH. Drive mechanism for utility or commercial vehicles such as tractors, construction machinery or the like. 4,116,313, Cl. 192-3.630.
Maurer Engineering, Inc.: *See—*
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Max Planck-Gesellschaft zur Forderung der Wissenschaften: *See—*
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Maxson, Myron T.: *See—*
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Maxwell, David. Disposable fluid dispenser. 4,116,571, Cl. 401-264.000.
May, Geoffrey John: *See—*
Markin, Trevor Leslie; Bones, Roger John; Scott, Keith Taylor; May, Geoffrey John; and Robinson, Graham, 4,117,209, Cl. 429-104.000.
May, Timothy T.: *See—*
Harriman, Russell H.; and May, Timothy T., 4,116,469, Cl. 282-23.00R.
Mayer, Endre A.; and Kelso, Charles R., to Bendix Corporation, The. Radial carburetor. 4,116,185, Cl. 123-139.0AW.
Mayer, Frederick J.: *See—*
Moncur, Norman K.; and Mayer, Frederick J., 4,116,542, Cl. 350-321.000.
Mayer, Rolf, to Bosch-Siemens Hausgerate GmbH. Household appliance driven by an electric motor, especially slicing machine for foods. 4,116,099, Cl. 83-571.000.
Mayer, Steven T.; and Milner, Ronald E., to Atari, Inc. Method for generating a plurality of moving objects on a video display screen. 4,116,444, Cl. 273-101.200.
Mazzorana, Alfred Bruno, to Societe de Paris et du Rhone. Starters. 4,116,077, Cl. 74-7.00A.
McAusland, Robert R.: *See—*
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McCary, Richard O.: *See—*
Becker, Joseph J.; Luborsky, Fred E.; Jacobs, Israel S.; and McCary, Richard O., 4,116,728, Cl. 148-108.000.
McClintock, William A.: *See—*
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McCord Corporation: *See—*
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McCormick, Harold E., to Ramsey Corporation. Method for increasing the life of silicon carbide grinding wheels. 4,115,959, Cl. 51-295.000.
McCown, Thomas E., to McDonnell Douglas Corporation. Cryogenic insulation system. 4,116,150, Cl. 114-74.00A.
McDonald, David Ian, to Cincinnati Milacron Inc. Conveyor combined with coupling for handling workpiece. 4,116,325, Cl. 198-484.000.
McDonald, John F.: *See—*
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McDonnell Douglas Corporation: *See—*
Charles, Ronald A.; Jones, Paul W.; Staples, John L.; and Wiegner, Joseph R., 4,116,775, Cl. 195-103.50M.
Coggins, Dolphus L.; and Gumbelevicius, John, 4,116,755, Cl. 156-659.000.
Hall, Roy F.; and Kramer, Elmer C., 4,116,580, Cl. 408-230.000.
McCown, Thomas E., 4,116,150, Cl. 114-74.00A.
Steube, Kenneth E., 4,116,161, Cl. 118-49.100.
Trudell, Richard W., 4,116,303, Cl. 181-252.000.
McDougal, John A.; and Lennington, John W. Internal combustion engine ignition system. 4,116,173, Cl. 123-117.00R.
McFadden, Arthur Raymond; and Aultz, Daniel Eugene, to American Hoechst Corporation. Oxofuranobenzoxepin-acetic acids, precursors and derivatives thereof. 4,117,152, Cl. 424-285.000.
McFarland, David Lee; and McFarland, Raymond Joseph. Automatic fluid fertilizer control apparatus. 4,116,138, Cl. 111-7.000.
McFarland, Raymond Joseph: *See—*
McFarland, David Lee; and McFarland, Raymond Joseph, 4,116,138, Cl. 111-7.000.
McGee, John K.; and Bridges, Charles D., to Gray Tool Company. Full flow tubing plug with locked anchor and method. 4,116,277, Cl. 166-315.000.
McGlynn, John F., to IPCO Hospital Supply Corporation. Disposable tape cord thermometer. 4,116,064, Cl. 73-362.0AR.
McGroddy, James Cleary; and Van Vechten, James Alden, to International Business Machines Corporation. Printing and displaying technology using selective laser beam pricking of liquid film for writing information. 4,117,497, Cl. 346-17.000.
McInerny, George P., to Brandt-Pra, Inc. Ticket counter and endorser. 4,116,127, Cl. 101-232.000.
McKendry, Lennon H.; and Bland, Walter P., to Dow Chemical Company, The. 4(3H)-Oxobenzo-2,1,3-thiadiazine-2,2-dioxides and derivatives thereof. 4,116,672, Cl. 71-91.000.
McKernan, Bernard J.; and Stargell, Donald E., to Van Dorn Company. Can end with protective fold. 4,116,360, Cl. 220-273.000.
McKinney, James T., to Minnesota Mining and Manufacturing Company. Ion scattering spectrometer including cylindrical mirror analyzer and ion gun axially positioned therewithin. 4,117,322, Cl. 250-309.000.
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Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, 4,116,818, Cl. 208-210.000.
Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, 4,116,819, Cl. 208-216.000.
McLarty, Colin S.: *See—*
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McMahon, Donald H., to Sperry Rand Corporation. Apparatus and method for high speed accessing of character images. 4,116,534, Cl. 350-157.000.

McMaster, Harold A. High temperature furnace. 4,117,252, Cl. 13-25.000.
McMullin, Dwain G.: *See*—
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McNeel, William O., to Geo Space Corporation. Fluid resistant geophone and cable enclosure. 4,117,449, Cl. 340-17.00R.
McNeil Corporation: *See*—
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McQuain, David B.: *See*—
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Meacham, Thomas E., Jr.; and Johnson, David C., to Refreshment Machinery Incorporated. Sterilization method. 4,116,630, Cl. 422-24.000.
Mead, Ralph T.; Rudolph, Frank W.; Frenz, Norbert W., Jr.; and Greatbatch, Wilson, to Wilson Greatbatch Ltd. Lithium-iodine battery. 4,117,212, Cl. 429-153.000.
Medalie Manufacturing Co.: *See*—
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Mefina S.A.: *See*—
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Megahed, Shenoda S., to Becton, Dickinson and Company. Adapter for the aspiration nozzle of an automatic analytical instrument. 4,116,068, Cl. 73-425.40P.
Meguro, Kanji; and Kuwada, Yutaka, to Takeda Chemical Industries, Ltd. Benzodiazepine derivatives. 4,116,956, Cl. 260-239.0BD.
Mehl, Jack J.; and Nugent, Edward L., to Becton, Dickinson and Company. Specimen sampler cup. 4,116,066, Cl. 73-421.00R.
Meier, Hanspeter, to Dr. Ing. Hans Mueller. Filter element for disc-type filter. 4,116,842, Cl. 210-330.000.
Meikle & Devine, Inc.: *See*—
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Meikle, Warren: *See*—
Varga, Theodore; Devine, Arthur, Jr.; and Meikle, Warren, 4,116,424, Cl. 269-55.000.
Melgaard, Hans L., to Despatch Industries, Inc. Gas monitor system. 4,116,612, Cl. 431-76.000.
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Melley Energy Systems: *See*—
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Melley, Joseph F., Jr., to Melley Energy Systems. Utility frame for mobile electric power generating systems. 4,117,342, Cl. 290-1.00A.
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Meng, Ilse Freida, legal representative: *See*—
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Moller, Eike; Meng, Karl-August, deceased; Wehinger, Egbert; Horstmann, Harald; and Seuter, Friedel, 4,117,143, Cl. 424-273.00P.
Moller, Eike; Meng, Karl-August, deceased; Wehinger, Egbert; Horstmann, Harald; and Seuter, Friedel, 4,117,145, Cl. 424-273.00P.
Menth, Anton; Perry, Anthony J.; and Spinner, Ulrich, to BBC Brown, Boveri & Company Limited. As-cast permanent magnet Sm-Co-Cu material with iron, produced by annealing and rapid quenching. 4,116,726, Cl. 148-31.570.
Merkl, George G. Method of preparing oxygen-containing bleach and product so produced. 4,116,859, Cl. 252-186.000.
Merkl, George G. Hydrophosphide-group containing multi-metal inorganic polymeric complex and method of making same. 4,117,088, Cl. 423-299.000.
Merkl, George G. Hydrosulfide-groups containing multi-metal inorganic polymeric complex and method of making same. 4,117,099, Cl. 423-511.000.
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Metcalf, Guy D.: *See*—
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Methner, Arnold; and Mesle, Reinhold, to J. & J. Marquardt. Electric switch. 4,117,286, Cl. 200-76.000.
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Metzger, Kirk J.: *See*—
Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, 4,116,817, Cl. 208-210.000.
Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, 4,116,818, Cl. 208-210.000.
Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, 4,116,819, Cl. 208-216.000.
Meyer, Jeffrey G., to Anderson Development Company. Nickel bisdiorgano-orthophosphates their preparation and use. 4,117,022, Cl. 260-669.00P.
Meyer, Josef: *See*—
Motz, Karl; Meyer, Josef; and Schurrer, Josef, 4,116,501, Cl. 308-9.000.
Meyer, Richard C.: *See*—
Lillig, John E.; Meyer, Richard C.; and Anderson, Robert J., 4,117,414, Cl. 330-149.000.
Meyer, Wilhelm, to Varian MAT Gesellschaft mit beschrankter Haftung. Electrode system for multipoles and especially for multipole or monopole mass spectrometers. 4,117,321, Cl. 250-292.000.
Meyerhoff, Robert Wagner, to Union Carbide Corporation. AC Superconducting articles and a method for their manufacture. 4,115,916, Cl. 29-599.000.
Mia, Abdus Salam, to Pitman-Moore, Inc. Globulin test. 4,116,633, Cl. 23-230.00B.
Michaeli, Dov. Method of inhibiting flea-bite allergy. 4,117,141, Cl. 424-273.00R.
Michel, Edmond: *See*—
Obsomer, Marc; Bodson, Luc; and Michel, Edmond, 4,116,609, Cl. 425-526.000.
Micheli, Adolph L., to General Motors Corporation. Method of making boron containing strontium ferrite. 4,117,058, Cl. 264-65.000.
Michurov, Jury Ivanovich: *See*—
Abramov, Ivan Egorovich; Gershanov, Felix Borisovich; Dolidze, Vladimir Romanovich; Zakharova, Nina Vasilievna; Liakumovich, Alexandr Grigorievich; Michurov, Jury Ivanovich; Popov, Vasily Dmitrievich; Rutman, Grigory Iosifovich; and Shalimova, Zoya Stepanovna, 4,117,244, Cl. 568-799.000.
Midgard Electronics Company, Inc.: *See*—
Pettijohn, David, 4,116,238, Cl. 128-172.100.
Midland-Ross Corporation: *See*—
Acre, Sydney R.; and Lake, Marquis J., Sr., 4,116,218, Cl. 137-627.500.
Midrex Corporation: *See*—
Pietsch, Wolfgang B., 4,116,679, Cl. 75-34.000.
Migitaka, Wataru: *See*—
Sunago, Hirofumi; and Migitaka, Wataru, 4,116,815, Cl. 208-87.000.
Mihalcheon, Arthur. Hinge and roller support device for sectional door. 4,115,900, Cl. 16-104.000.
Mikhailov, Mikhail Mikhailovich: *See*—
Cherny, Viktor Yakovlevich; Galperin, Boris Grigorievich; Mikhailov, Mikhail Mikhailovich; Meljukhov, Vladimir Petrovich; and Dobrokhotov, Leonid Vasilievich, 4,116,592, Cl. 417-424.000.
Mikhlina, Eva Evseevna: *See*—
Mashkovsky, Mikhail Davydovich; Yakhontov, Leonid Nikolaevich; Ado, Andrei Dmitrievich; Kaminka, Mikhail Emmanuilovich; Mikhlina, Eva Evseevna; Vorobieva, Valentina Yakovlevna; Yanina, Anna Dmitrievna; and Komarova, Nadezhda Andreevna, 4,117,139, Cl. 424-267.000.
Mikitaev, Abdulakh Kazbulatovich: *See*—
Korshak, Vasily Vladimirovich; Vinogradova, Svetlana Vasilievna; Storozhuk, Ivan Pavlovich; Valetsky, Petr Maximilianovich; Sokolov, Lev Borisovich; Mikitaev, Abdulakh Kazbulatovich; Askadsky, Andrei Alexandrovich; Kochergin, Jury Sergeevich; Slonimsky, Grigory Lvovich; Shirokova, Larisa Borisovna; Nebosenko, Ljudmila Fedorovna; and Zhuravlev, Nikolai Danilovich, 4,116,940, Cl. 528-173.000.
Mikiver, Lembit: *See*—
Jonsson, Nils Ake; Mikiver, Lembit; and Moses, Pinchas, 4,117,144, Cl. 424-274.000.
Millar, Richard C.: *See*—
Folland, Roy E.; and Millar, Richard C., 4,117,550, Cl. 366-136.000.
Miller, Alan Leonard, to Borg-Warner Corporation. Valve arrangement for closed-loop control system. 4,116,321, Cl. 192-103.00F.
Miller, Albert J., to Engineering Systems Corporation. Ultrasonic transmitter for burglar alarm system. 4,117,462, Cl. 340-539.000.
Miller, Charles Newell, to Control Data Corporation. Method for forming curved plastic film from a flat film. 4,117,068, Cl. 264-130.000.
Miller, Craig Salvatore. Fluid mattress with squared gusset panel construction. 4,115,886, Cl. 5-365.000.
Miller, John R.: *See*—
Charter, Kenneth F.; Miller, John R.; and Garrett, David W., 4,117,067, Cl. 264-119.000.
Miller, Michael George: *See*—
Cummins, Peter Gerald; Sinton, Bernard; and Miller, Michael George, 4,117,185, Cl. 428-241.000.
Miller, Myrl J.: *See*—
Libby, Edwin L.; and Miller, Myrl J., 4,116,562, Cl. 355-60.000.
Libby, Edwin Langford; and Miller, Myrl J., 4,116,554, Cl. 355-11.000.
Milliken Research Corporation: *See*—
Varner, George Clifford, 4,116,626, Cl. 8-149.000.

Millipore Corporation: *See—*
Edwards, James H., 4,116,646, Cl. 55-159.000.
Milne, George M., Jr.: *See—*
Hammen, Philip D.; and Milne, George M., Jr., 4,117,012, Cl. 260-570.80R.
Milner, Donald L. Apparatus for printing on compressible material. 4,116,126, Cl. 101-217.000.
Milner, Ronald E.: *See—*
Mayer, Steven T.; and Milner, Ronald E., 4,116,444, Cl. 273-101.200.
Mimura, Yoshiyuki: *See—*
Kagami, Akiyasu; Hase, Takashi; Mimura, Yoshiyuki; Narita, Kinichiro; and Hiraki, Minoru, 4,116,864, Cl. 252-301.60S.
Minagawa, Motonobu; Kubota, Naohiro; and Shibata, Toshihiro, to Argus Chemical Corporation. 2,2,6,6-Tetramethyl-4-piperidyl carboxylic acid esters of butane or butene tri carboxylic acids as stabilizers for synthetic polymers. 4,116,927, Cl. 260-45.8NZ.
Minami, Kazuto; Tsukui, Norihiko; and Imamoto, Tsunehiko, to Dai Nippon Printing Co., Ltd. Decorative laminated structures and method of making the same. 4,117,181, Cl. 428-138.000.
Minato, Sadamasa; Hattori, Atsushi; Baba, Yoshihiko; Yabe, Yuichiro; and Ueda, Seigo, to Sankyo Company Limited. Method for the determination of enzyme activities. 4,116,774, Cl. 195-99.000.
Mine Safety Appliances Company: *See—*
King, Earle Cochran, 4,116,834, Cl. 210-96.00R.
Mineo, Masatoshi: *See—*
Nakagawa, Kiyoshi; Mineo, Masatoshi; Matsumoto, Tadayuki; and Imaeda, Kozo, 4,115,988, Cl. 57-140.0BY.
Minhas, Pritam S.; and Sukornick, Bernard, to Allied Chemical Corporation. Flame retardant fibers, carpets and molding compounds and methods of making same. 4,116,931, Cl. 260-45.75B.
Minnesota Mining and Manufacturing Company: *See—*
Fridinger, Tomas L.; Moore, George G. I.; and Lappi, Larry R., 4,116,676, Cl. 71-103.000.
Jorgensen, Jens L., 4,117,192, Cl. 428-337.000.
McKinney, James T., 4,117,322, Cl. 250-309.000.
Nidelkoff, James G., 4,115,936, Cl. 40-449.000.
Minnick, Robert C.; Bailey, Paul T.; Sandfort, Robert M.; and Semon, Warren L., to Monsanto Company. Magnetic bubble logic family. 4,117,543, Cl. 365-5.000.
Minohara, Kiyomi; and Sugiyama, Akira, to Furuno Electric Co., Ltd. Electronically scanned echo pulse receiver. 4,117,487, Cl. 343-100.0SA.
Minolta Camera Kabushiki Kaisha: *See—*
Kushima, Teizo; Kurita, Takaji; and Mizunoe, Hiroaki, 4,116,557, Cl. 355-8.000.
Tanaka, Susumu; Ogawa, Masaya; Kawabata, Hidetoshi; Fujiwara, Takao; Kurita, Takaji; Enoguchi, Yuji; Wada, Kenichi; and Murasaki, Hiroshi, 4,116,556, Cl. 355-3.0SH.
Minox GmbH: *See—*
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Minshall, Georgia R.: *See—*
Nelson, Marvin H.; and Minshall, Georgia R., 4,116,340, Cl. 211-13.000.
Miracle, William C.: *See—*
Reed, Ronald H.; Miracle, William C.; and McMullin, Dwain G., 4,117,530, Cl. 361-365.000.
Miranol Chemical Company, Inc., The: *See—*
Christiansen, Arvid, 4,117,231, Cl. 548-352.000.
Misaka, Yoshisuke: *See—*
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Mischenko, Tamara Sergeevna: *See—*
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Mishima, Michiharu: *See—*
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Mitsubishi Chemical Industries Ltd.: *See—*
Imahori, Seiichi; Murata, Yukichi; and Suzuki, Sumio, 4,116,623, Cl. 8-25.000.
Kakogawa, Genjiro; Suzuki, Tetsumi; Goko, Nobuaki; and Mukuraguchi, Koji, 4,117,219, Cl. 528-494.000.
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,117,127, Cl. 424-247.000.
Mitsubishi Denki Kabushiki Kaisha: *See—*
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Nakata, Josuke, 4,117,505, Cl. 357-28.000.
Yonemoto, Masashi, 4,117,382, Cl. 318-163.000.
Mitsui Coke Co., Ltd.: *See—*
Tatsumoto, Katsunobu; and Fukuda, Kenji, 4,117,098, Cl. 423-448.000.
Mitsui Mining Company, Limited: *See—*
Tatsumoto, Katsunobu; and Fukuda, Kenji, 4,117,098, Cl. 423-448.000.
Mittenzwei, Hellmut; and Terpin, Janez, to Mittenzwei, Hellmut. Process for removal of inorganicsalts from peptide/salt-containing substances. 4,116,948, Cl. 260-112.00R.
Miura, Nobuhiro: *See—*
Yanagihara, Hiromichi; and Miura, Nobuhiro, 4,116,234, Cl. 123-32.0SP.
Miyagawa, Toru: *See—*
Sugiura, Kensuke; Miyagawa, Toru; and Seki, Haruo, 4,116,874, Cl. 252-46.700.
Miyahara, Junji; and Kato, Hisatoyo, to Fuji Photo Film Co., Ltd. Rear projection screens. 4,116,911, Cl. 260-28.50A.
Miyake, Haruhisa: *See—*
Ukihashi, Hiroshi; Asawa, Tatsuro; Yamabe, Masaaki; and Miyake, Haruhisa, 4,116,888, Cl. 521-31.000.
Miyake, Kazuhiko; and Yamada, Bunkichi, to Tokyo Shibaura Electric Co., Ltd. Apparatus for providing a video montage to a television picture image. 4,117,512, Cl. 358-183.000.
Miyanaga, Kunio; and Kawada, Kosaku, to Chemi-Con Onkyo Co., Ltd. Non-directional electret microphone with an air passage to balance pressures on opposite sides of the diaphragm. 4,117,275, Cl. 179-111.00E.
Miyazawa, Chiaki: *See—*
Hishida, Yukio; Asai, Yuichi; Kondo, Toshikatsu; Asai, Akira; Sakaida, Atsuo; and Miyazawa, Chiaki, 4,117,435, Cl. 335-270.000.
Mizuguchi, Ryuzo; Takahashi, Atsushi; and Ishikura, Shinichi, to Nippon Paint Co., Ltd. Aqueous resin dispersion and thermosetting paint composition containing same. 4,116,912, Cl. 260-29.4UA.
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Mizusawa Kagaku Kogyo Kabushiki Kaisha: *See—*
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Mo och Domsjo Aktiebolag: *See—*
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Moalic, Jean-Pierre: *See—*
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Haag, Werner O.; and Olson, David H., 4,117,026, Cl. 260-671.00R.
Kaeding, Warren W., 4,117,024, Cl. 260-671.00R.
Nnadi, John C.; and Heilweil, Israel J., 4,116,875, Cl. 252-49.700.
Peiser, Alfred M., 4,116,821, Cl. 208-361.000.
Rubin, Mae K.; Rosinski, Edward J.; and Plank, Charles J., 4,116,813, Cl. 208-46.000.
Zahner, John C., 4,116,814, Cl. 208-78.000.
Mochinaga, Kishio: *See—*
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Moeser, Douglas W.: *See—*
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Mogi, Keitaro: *See—*
Noda, Fumio; Mogi, Keitaro; and Sakasai, Toshio, 4,117,169, Cl. 426-7.000.
Mohler, Sailor H. Balancing system. 4,116,073, Cl. 73-483.000.
Moinard, Jean Robert: *See—*
Lehn, Jean-Marie; Schue, Francois; Boileau, Sylvia; Kaempf, Bernd; Cau, Alain Andre; Moinard, Jean Robert; and Raynal, Serge Fernand, 4,116,887, Cl. 260-2.00A.
Molesworth, Richard E.: *See—*
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Moller, Eike; Meng, Karl-August, deceased (by Meng, Ilse Heide Frieda, heir); Wehinger, Egbert; Horstmann, Harald; and Seuter, Friedel, to Bayer Aktiengesellschaft. 1-Substituted pyrazoles. 4,117,143, Cl. 424-273.00P.
Moller, Eike; Meng, Karl-August, deceased (by Meng, Ilse Freida, legal representative); Wehinger, Egbert; Horstmann, Harald; and Seuter, Friedel, to Bayer Aktiengesellschaft. 1-Substituted pyrazoles. 4,117,145, Cl. 424-273.00P.
Mollet, Hans; Haberli, Roland; Rabassa, Alberto; and Babler, Fridolin, to Ciba-Geigy AG. Novel process for the complete isolation and rapid drying of solids from suspensions. 4,117,066, Cl. 264-117.000.
Molnar, Francois; Szabo, Suzanne; and Statkov, Peter Radanow, to Cermol S.A. Phenoxy compounds and compositions. 4,117,160, Cl. 424-316.000.
Molnar, Imre: *See—*
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Monarch Marking Systems, Inc.: *See—*
Hamisch, Paul H., Jr., 4,116,746, Cl. 156-384.000.
Hamisch, Paul H., Jr., 4,116,747, Cl. 156-384.000.
Moncur, Norman K.; and Mayer, Frederick J., to KMS Fusion, Inc. Method and apparatus for reducing coherence of high-power laser beams. 4,116,542, Cl. 350-321.000.

Mongeon, Robert Joseph: *See—*
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Monsanto Company: *See—*
Appleford, David Dale; and Warwick, Paul Stephen, 4,116,048, Cl. 73-83.000.
Brannigan, Lawrence H.; Franz, John E.; and Howe, Robert K., 4,116,673, Cl. 71-92.000.
Coran, Aubert Y.; and Patel, Raman P., 4,116,914, Cl. 260-30.60R.
Fields, Joseph E.; and Johnson, John H., 4,117,111, Cl. 424-78.000.
Hill, James C.; and Knox, Walter R., 4,116,944, Cl. 528-366.000.
Minnick, Robert C.; Bailey, Paul T.; Sandfort, Robert M.; and Semon, Warren L., 4,117,543, Cl. 365-5.000.
Mount, Ramon A.; Raffelson, Harold; and Robinson, Warn D., 4,116,868, Cl. 252-428.000.
Montrouil Enterprises, Inc.: *See—*
Montrouil, George W., 4,115,964, Cl. 52-106.000.
Montrouil, George W., to Montrouil Enterprises, Inc. Windows and method of making the same. 4,115,964, Cl. 52-106.000.
Moog, Robert A., to Norlin Music, Inc. Amplifier with multifilter. 4,117,413, Cl. 330-126.000.
Moon, William T., Jr.: *See—*
Bible, Harley V.; Goff, Clifford E.; and Moon, William T., Jr., 4,116,155, Cl. 116-65.000.
Moore, Curtis L., to Electric Power Research Institute, Inc. Overpressure protection for vaporization cooled electrical apparatus. 4,117,525, Cl. 361-37.000.
Moore, George G. I.: *See—*
Fridinger, Tomas L.; Moore, George G. I.; and Lappi, Larry R., 4,116,676, Cl. 71-103.000.
Moore, John R.: *See—*
Selvin, Gerald J.; and Moore, John R., 4,116,517, Cl. 339-17.00F.
Moore Products Co.: *See—*
Goble, William M., 4,117,411, Cl. 330-10.000.
Moore, Randall J. Apparatus for increasing the blend and charge of the fuel-air mixture for an engine. 4,116,187, Cl. 123-141.000.
Moore, William Thomas: *See—*
Freer, William Gordon; Pincherle, Hugh Andrew; and Moore, William Thomas, 4,117,472, Cl. 340-324.00M.
Moran, Daniel Bryan: *See—*
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Moreland, Gerald W.: *See—*
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Morelli, Morello: *See—*
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Morgan, Charles Robert; and Bush, Richard Wayne, to W. R. Grace & Co. Process for preparation of thiols using a benzopinacol initiator. 4,117,017, Cl. 260-609.00R.
Morgan, David W.: *See—*
Boyd, David C.; Flannery, James E.; Morgan, David W.; Rosplock, Sara E.; and Sczerbaniewicz, Stella A., 4,116,704, Cl. 106-54.000.
Morgan, Peter A.: *See—*
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Morgan, William Morris: *See—*
Huntley, Frank Alfred; and Morgan, William Morris, 4,116,754, Cl. 156-656.000.
Morganroth, Shila. Methods of preparing bleach paste for and applying it to hair. 4,116,365, Cl. 222-92.000.
Mori, Fumio; Omura, Yoshiaki; Nishida, Takashi; and Itoi, Kazuo, to Kuraray Co., Ltd. Preparation of 1,1,1-trihalogeno-4-methyl-3-penten-2-ol. 4,117,247, Cl. 568-845.000.
Mori, Kaoru: *See—*
Isowa, Yoshikazu; Ohmori, Muneki; Kurita, Hideaki; Ichikawa, Tetsuya; Sato, Masanari; Mori, Kaoru; and Oyama, Kiyotaka, 4,116,768, Cl. 195-29.000.
Mori, Mamoru: *See—*
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Murai, Hiromu; Fujita, Yukio; Mori, Tamiki; Enomoto, Hiroshi; and Yoshikuni, Yoshiaki, 4,117,159, Cl. 424-309.000.
Mori, Teruo; and Ohashi, Azusa, to Fuji Photo Film Co., Ltd. Method of producing a support for a printing plate. 4,116,695, Cl. 96-86.00P.
Morini, Rino. Device for stepwise feeding a hose for packaging products, in particular fruit and vegetable products. 4,115,979, Cl. 53-393.000.
Morishita, Syozo: *See—*
Inouye, Yoshinori; Kanamori, Hiromitsu; Tsuchida, Nobuo; Morishita, Syozo; and Endo, Tetsuhiko, 4,116,393, Cl. 242-1.000.
Moritomo, Sadao; and Ando, Shigenori, to Seiko Seiki Kabushiki Kaisha. Preloaded bearing. 4,116,506, Cl. 308-189.00A.
Moriya, Ikuro; and Tsuruta, Masao, to Fuji Photo Film Co., Ltd. Method and apparatus for wind loading film magazines. 4,115,913, Cl. 29-450.000.
Moriya, Tokio, to Kabushiki Kaisha Daini Seikosha. Digital alarm watch. 4,115,993, Cl. 58-38.00R.
Moriya, Tomoyuki: *See—*
Suzuki, Takami; Suzaki, Masayuki; and Moriya, Tomoyuki, 4,116,568, Cl. 400-320.000.
Morlock, Gerhard: *See—*
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Morokuma, Tadashi; and Fujimori, Ryo, to Olympus Optical Co., Ltd. Process of and apparatus for forming a picture image information such as a manuscript, etc. on a dry treated film and developing the same. 4,116,559, Cl. 355-28.000.
Morris, Jerry M.; Cole, Leon Jay; and Rawls, Vaughn, to National-Standard Company. Tire buffing apparatus. 4,116,256, Cl. 157-13.000.
Morris, Patrick Evan: *See—*
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Morrison, Leonard A.: *See—*
Hampton, Robert S., Jr.; Morrison, Leonard A.; Murphy, John W.; and Mountz, Craig E., 4,115,926, Cl. 33-288.000.
Morton, Douglas Ross, Jr., to Upjohn Company, The. Inter-oxa-13,14-dihydro-9β-PGD$_1$ compounds. 4,117,005, Cl. 562-503.000.
Morucci, Jean-Pierre: *See—*
Lansiart, Alain; Morucci, Jean-Pierre; and Seigneur, Alain, 4,117,330, Cl. 250-361.00R.
Mosburger, Hans; and Reis, Christoph, to BHS-Bayerische Berg-, Hutten- und Salzwerke Aktiengesellschaft. Device for automatically detecting the end of a web and splicing a new web thereto. 4,116,399, Cl. 242-58.400.
Moschetto, Yves: *See—*
Trinel, Pierre-Andre; Leclerc, Henri; and Moschetto, Yves, 4,116,631, Cl. 23-230.00B.
Moscovich, Jacob, to Vivitar Corporation. Wide angle lens. 4,116,536, Cl. 350-214.000.
Moser, Kurt: *See—*
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Moser, Wilhelm: *See—*
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Motoren-und Turbinen-Union Friedrichshafen GmbH: *See—*
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Motoren- und Turbinen-Union Munchen GmbH: *See—*
Kauf, Alois; Kandler, Georg; Rossmann, Axel; and Nustede, Fritz, 4,116,149, Cl. 113-116.00D.
Motorola, Inc.: *See—*
Bender, Steven Frank, 4,117,410, Cl. 329-50.000.
Hunt, Albert Henry, 4,117,422, Cl. 331-18.000.
Schoemer, Hans Louis, 4,117,279, Cl. 200-5.00A.
Zurawski, Ronald Anthony, 4,117,276, Cl. 179-161.000.
Motz, Karl; Meyer, Josef; and Schurrer, Josef, to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft. Cooling installation for the reduction of the oil temperature of oil-lubricated damping bearings. 4,116,501, Cl. 308-9.000.
Mount, Ramon A.; Raffelson, Harold; and Robinson, Warn D., to Monsanto Company. Method for preparing an oxidation catalyst. 4,116,868, Cl. 252-428.000.
Mountz, Craig E.: *See—*
Hampton, Robert S., Jr.; Morrison, Leonard A.; Murphy, John W.; and Mountz, Craig E., 4,115,926, Cl. 33-288.000.
Mousson, Roland Georges: *See—*
Lamelot, Pierre Marie Louis; and Mousson, Roland Georges, 4,117,327, Cl. 250-338.000.
Movick, Nyle Orland. Heating apparatus. 4,116,379, Cl. 237-1.00A.
Mower, Morris F.: *See—*
Johnson, Eugene R.; and Mower, Morris F., 4,116,604, Cl. 425-458.000.
Mozzhukhin, Anatoly Alexandrovich; and Sotchenko, Vladimir Petrovich. Apparatus for hard facing of valves for internal combustion engines. 4,116,375, Cl. 228-48.000.
Mravic, Brian; Shapiro, Stanley; Tyler, Derek E.; and Khan, Abid, to Olin Corporation. Copper base alloys possessing improved processability. 4,116,686, Cl. 75-154.000.
Muchow, John D., to Willis Oil Tool Co. Automatic reset pilot valve. 4,116,215, Cl. 137-596.180.
Muench, Paul William, to Borg-Warner Corporation. System and method for limiting energy consumption. 4,117,537, Cl. 364-492.000.
Mufti, Khizar Sultan: *See—*
Khan, Riaz Ahmed; Mufti, Khizar Sultan; and Parker, Kenneth John, 4,117,224, Cl. 536-119.000.
Mukai, Kunihiko; Mishima, Michiharu; Ogino, Kiyoshi; and Iseki, Shuichi, to Central Glass Company, Limited; and Mukai, Kunihiko. Method of manufacturing fibers of inorganic material and apparatus for same. 4,116,656, Cl. 65-5.000.
Mukuraguchi, Koji: *See—*
Kakogawa, Genjiro; Suzuki, Tetsumi; Goko, Nobuzki; and Mukuraguchi, Koji, 4,117,219, Cl. 528-494.000.
Muller, Bruce M., to Customcolor, Inc. Particle and method for dispersing additives in thermoplastic resin. 4,116,909, Cl. 260-23.70R.
Muller, Hans, to GRAPHA-Holding AG. Apparatus for stuffing newspapers or the like. 4,116,427, Cl. 270-54.000.
Muller, Lutz: *See—*
Schiweck, Hubert; Steinle, Georg; Muller, Lutz; Gau, Wolfgang; and Munir, Mohammad, 4,117,173, Cl. 426-548.000.
Muller, Manfred: *See—*
Hirschfeld, Dieter; and Muller, Manfred, 4,116,724, Cl. 148-3.000.

Muller, Michael: *See—*
Kim, Kirk J.; and Muller, Michael, 4,117,438, Cl. 336-75.000.
Multiform Desiccant Products, Inc.: *See—*
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Schiweck, Hubert; Steinle, Georg; Muller, Lutz; Gau, Wolfgang; and Munir, Mohammad, 4,117,173, Cl. 426-548.000.
Munn, John W.; and Munn, Kevin J. Dining utensil. 4,116,355, Cl. 220-83.000.
Munn, Kevin J.: *See—*
Munn, John W.; and Munn, Kevin J., 4,116,355, Cl. 220-83.000.
Murai, Hiromu; Fujita, Yukio; Mori, Tamiki; Enomoto, Hiroshi; and Yoshikuni, Yoshiaki, to Nippon Shinyaku Co., Ltd. Pharmaceutically active deltab-dihydropimaramide derivatives. 4,117,159, Cl. 424-309.000.
Murakami, Kakuji: *See—*
Machida, Hazime; Tamura, Hiroshi; and Murakami, Kakuji, 4,116,698, Cl. 106-2.000.
Murakami, Tadayoshi: *See—*
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Muranyi, Istvan: *See—*
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Tanaka, Susumu; Ogawa, Masaya; Kawabata, Hidetoshi; Fujiwara, Takao; Kurita, Takaji; Enoguchi, Yuji; Wada, Kenichi; and Murasaki, Hiroshi, 4,116,556, Cl. 355-3.0SH.
Murata, Yukichi: *See—*
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Murphy, John W.: *See—*
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Murray, David: *See—*
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Murray, John A., to U.S. Terrazzo Panels, Inc. Method and apparatus for the manufacture of concrete products. 4,117,059, Cl. 264-82.000.
Murray, John A., to U.S. Terrazzo Panels, Inc. Method and apparatus for the manufacture of concrete and like products. 4,117,060, Cl. 264-82.000.
Murray, Lawrence: *See—*
Ramer, Mervin, 4,116,123, Cl. 100-233.000.
Murray, Stephen C. Hang glider with collapsible airfoil. 4,116,407, Cl. 244-16.000.
Muryobayashi, Takashi: *See—*
Kurono, Masayasu; Nakai, Hisao; and Muryobayashi, Takashi, 4,117,119, Cl. 424-180.000.
Musgrave, Daniel D. Reserve magazine holder. 4,115,943, Cl. 42-90.000.
Musgrave, Daniel D. Ballistic cutters. 4,115,944, Cl. 42-90.000.
Muska, Willis Martin: *See—*
Hubbard, William Marshall; and Muska, Willis Martin, 4,116,532, Cl. 350-96.210.
Musselman, Camillus B.; and Bovier, Edward M., to Anheuser-Busch, Incorporated. Water resistant corrugating adhesive composition. 4,116,740, Cl. 156-205.000.
Myasoedov, Viktor Vasilievich: *See—*
Maslov, Vadim Nikolaevich; Korobov, Oleg Evgenievich; Lupacheva, Alla Naumovna; Vlasov, Alexandr Nikolaevich; Myasoedov, Viktor Vasilievich; Bochkarev, Ellin Petrovich; Gimelfarb, Felix Aronovich; Bronshtein, Izidor Karlovich; Lukicheva, Natalya Ivanovna; Sinitsyn, Evgeny Vladimirovich; Sokurenko, Jury Varnavovich; Jurova, Elena Sergeevna; Kistova, Elena Mikhailovna; Konstantinova, Marina Andreevna; and Samaginov, Veniamin Mikhailovich, 4,117,504, Cl. 357-16.000.
N L Industries, Inc.: *See—*
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Finlayson, Claude Malcolm, 4,116,866, Cl. 252-316.000.
Nagai, Katsumi: *See—*
Takahashi, Yuzo; Wazima, Yoshimi; Nakada, Akira; Tanaka, Yasuyuki; Nagai, Katsumi; Takahashi, Nobuo; Matsuda, Hiroshi; Aizawa, Eizi; and Oyama, Shiro, 4,117,188, Cl. 428-36.000.
Nagano-Ken Kohridofu Kogyo Cooperative Association: *See—*
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Nagano, Masashi; and Watarai, Etsuyoshi, to Shimano Industrial Company Limited. Rear gear for a bicycle. 4,116,319, Cl. 192-64.000.
Nagasawa, Koyo: *See—*
Shintani, Takamasa; and Nagasawa, Koyo, 4,117,517, Cl. 358-260.000.
Nagasawa, Masao, to Nippondenso Co., Ltd. Capacitor discharge type contactless ignition system for internal combustion engines. 4,116,188, Cl. 123-148.0CC.
Nagumo, Shin-ichi; Hayashi, Yoshimasa; and Otsubo, Kizuku, to Nissan Motor Company, Limited. Dual spark-ignition internal combustion engine. 4,116,179, Cl. 123-119.00A.
Nagumo, Shin-ichi: *See—*
Hayashi, Yoshimasa; and Nagumo, Shin-ichi, 4,116,180, Cl. 123-119.00A.
Naito, Hiroyuki: *See—*
Sugahara, Yujiro; Noshi, Yoshibumi; Naito, Hiroyuki; Saito, Mamoru; Takahashi, Akira; and Tuchida, Hisashi, 4,117,104, Cl. 423-619.000.
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Nakada, Akira: *See—*
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Nakagawa, Hiroshi: *See—*
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Nakagawa, Kiyoshi; Mineo, Masatoshi; Matsumoto, Tadayuki; and Imaeda, Kozo, to Toray Industries, Inc. Interlaced multifilament yarns. 4,115,988, Cl. 57-140.0BY.
Nakagome, Takenari: *See—*
Yamada, Hirotada; Okamura, Kosaku; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,117,126, Cl. 424-246.000.
Nakai, Hisao: *See—*
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Nakajima, Toshi: *See—*
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Nakajima, Yasuo; and Hayashi, Yoshimasa, to Nissan Motor Company, Limited. Dual spark plug ignition internal combustion engine. 4,116,181, Cl. 123-119.00A.
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Nakamoto, Hiromasa: *See—*
Pernet, Andre G.; Nakamoto, Hiromasa; and Ishizuka, Naoyasu, 4,117,014, Cl. 260-586.00R.
Nakamura, Hideki: *See—*
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Nakata, Josuke, to Mitsubishi Denki Kabushiki Kaisha. Thyristor with heat sensitive switching characteristics. 4,117,505, Cl. 357-28.000.
Nakata, Yuichi; and Murakami, Tadayoshi, to Pigeon Kabushiki Kaisha. Gum brush for infants. 4,115,893, Cl. 15-110.000.
Nakatani, Masaji: *See—*
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Nakatogawa, Yoshio, to Alps Electric Co., Ltd. Encapsulated reinforcement in moulded shaft. 4,116,575, Cl. 403-265.000.
Nakaya, Akira: *See—*
Yamazaki, Hironobu; Uchida, Yoshiaki; and Nakaya, Akira, 4,116,487, Cl. 299-1.000.
Napier, Donald Stewart. Building panel and wall. 4,115,969, Cl. 52-233.000.
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Nardi, John C.; Hussey, Charles L.; Erbacher, John K.; King, Lowell A.; and Fannin, Armand A., Jr. Molybdenum chloride-tetrachloroaluminate thermal battery. 4,117,207, Cl. 429-103.000.
Narita, Kinichiro: *See—*
Kagami, Akiyasu; Hase, Takashi; Mimura, Yoshiyuki; Narita, Kinichiro; and Hiraki, Minoru, 4,116,864, Cl. 252-301.60S.
Nasyrov, Gakif Zakirovich; Zemlyanskaya, Evgenia Ivanovna; and Ravdonikas, Izabella Vladislavovna. Process for alunite treatment. 4,117,077, Cl. 423-127.000.
National Electric Corporation: *See—*
Foreman, Luther M.; Heck, Samuel C.; and Wall, Bill R., 4,117,445, Cl. 338-198.000.
National Machine Company, Inc.: *See—*
Lauck, John A., 4,116,577, Cl. 417-286.000.
National Presto Industries, Inc.: *See—*
Anderl, Richard F.; and Tienor, Lawrence J., 4,115,918, Cl. 29-611.000.
National Research Development Corporation: *See—*
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National-Standard Company: *See—*
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NCR Corporation: *See—*
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Nedelec, Lucien; Frechet, Daniel; and Dumont, Claude, to Roussel Uclaf. Aminomethyl-benzocycloheptenes and method of use. 4,117,164, Cl. 424-330.000.

Needes, Christopher Roderick S., to Du Pont de Nemours, E. I., and Company. Catalytically active porous nickel electrodes. 4,116,804, Cl. 204-284.000.

Nees, John: *See*—
Windisch, Lawrence; Nees, John; and Channing, Harry M., 4,117,387, Cl. 320-2.000.

Neiman S.A.: *See*—
Lipschutz, Paul, 4,116,024, Cl. 70-201.000.

Nelson, Albin J., to Pfizer Inc. Pyrrolidonecarboxylic acid therapeutic agents. 4,117,138, Cl. 424-263.000.

Nelson, Don C., Jr.: *See*—
Boyd, John H., Jr.; and Nelson, Don C., Jr., 4,116,410, Cl. 248-26.000.

Nelson, Donald Louis, to Dow Chemical Company, The. Vinyl ester resin compositions containing dicyclopentadiene alkenoate. 4,117,030, Cl. 260-837.00R.

Nelson, Marvin H.; and Minshall, Georgia R. Game equipment holder. 4,116,340, Cl. 211-13.000.

Nelson, Merritt J., to Zin-Plas Corporation. Diverter spout assembly. 4,116,210, Cl. 137-119.000.

Nelson, Norman A., to Upjohn Company, The. 16-Phenoxy prostaglandin E_1 analogs. 4,116,988, Cl. 260-413.000.

Nelson, Norman A., to Upjohn Company, The. 16-Phenoxy prostaglandin $F_{1\alpha}$ analogs. 4,116,989, Cl. 260-413.000.

Nerem, Marvin E.; and Denney, Roger W. Step assembly for vehicle. 4,116,457, Cl. 280-166.000.

Neri, Carlo: *See*—
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Nerlich, Gunter, to Dimensional Products Limited. Stereoscopic viewer. 4,116,533, Cl. 350-135.000.

Netstal-Maschinen AG: *See*—
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New-Tronics Corp.: *See*—
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New York Institute of Technology: *See*—
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Newcomer Products, Inc.: *See*—
Gawryk, William C., Sr., 4,116,576, Cl. 407-114.000.

Newman, Francis L., to Rockwell International Corporation. Multiphase clock monitor circuit. 4,117,348, Cl. 307-232.000.

Nibble With Gibble's Inc.: *See*—
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Nichols, William E.: *See*—
Stratton, Boyd Lehman; and Nichols, William E., 4,117,521, Cl. 360-99.000.

Nicolay, Karl, to Durkoppwerke GmbH. Upper fabric feed device for sewing machines. 4,116,145, Cl. 112-212.000.

Nidelkoff, James G., to Minnesota Mining and Manufacturing Company. Changeable character sign structure. 4,115,936, Cl. 40-449.000.

Nieberlein, Vernon A., to United States of America, Army. Void, flaw, and crack indicator for epoxy bonds. 4,116,634, Cl. 23-230.00R.

Niederdellmann, Georg: *See*—
Thoma, Wilhelm; Wulff, Jochen; and Niederdellmann, Georg, 4,116,741, Cl. 156-239.000.

Nielsen, Tage Kjaer: *See*—
Amotz, Shmuel; Nielsen, Tage Kjaer; Poulsen, Poul Borge Rosenius; and Norman, Barrie Edmund, 4,116,771, Cl. 195-63.000.

Nier, Thomas J.: *See*—
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Nies, Carolyn J., executrix: *See*—
Evert, Donald A.; and Nies, Charles W., deceased, 4,116,401, Cl. 242-68.300.

Nies, Charles W., deceased: *See*—
Evert, Donald A.; and Nies, Charles W., deceased, 4,116,401, Cl. 242-68.300.

Nihon Denshi Kabushiki Kaisha: *See*—
Goto, Eiichi; Souma, Takashi; Idesawa, Masanori; and Tanaka, Kazumitsu, 4,117,340, Cl. 250-492.00A.

Nihon Seimitsu Keisoku: *See*—
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Nikitkin, Vasily Dmitrievich: *See*—
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.

Nikolov, Ivan Dimov; Rashev, Tzolo Valkov; Ivanov, Rangel Petrov; and Andreev, Chavdar Andreev, to Institute po Metaloznanie i Technologia na Metalite. Nickel-free austenitic corrosion-resistant steel. 4,116,683, Cl. 75-125.000.

Nimerick, Kenneth H.: *See*—
Parks, Christ F.; and Nimerick, Kenneth H., 4,117,214, Cl. 427-220.000.

Ning, Tak Hung; Osburn, Carlton Morris; and Yu, Hwa Nien, to International Business Machines Corporation. Gate charge neutralization for insulated gate field-effect transistors. 4,116,721, Cl. 148-1.500.

Nippon Carbon Co., Ltd.: *See*—
Ishikawa, Toshikatsu; Tanaka, Junichi; Tominaga, Yoichiro; Matsubara, Kunio; Kitazume, Yoshihiko; and Hayase, Tokuji, 4,117,051, Cl. 264-29.100.

Nippon Concrete Industries Co., Ltd.: *See*—
Abe, Nobuyuki; Watanabe, Osamu; Nunokawa, Koji; Tanaka, Ichiro; and Manabe, Masao, 4,116,012, Cl. 405-238.000.

Nippon Crucible Co., Ltd.: *See*—
Hosaka, Takuo; Sasaki, Tadao; and Suzuki, Hiroshige, 4,117,096, Cl. 423-345.000.

Nippon Oil Co., Ltd.: *See*—
Sugiura, Kensuke; Miyagawa, Toru; and Seki, Haruo, 4,116,874, Cl. 252-46.700.

Nippon Paint Co., Ltd.: *See*—
Mizuguchi, Ryuzo; Takahashi, Atsushi; and Ishikura, Shinichi, 4,116,912, Cl. 260-29.4UA.

Nippon Shinyaku Co., Ltd.: *See*—
Murai, Hiromu; Fujita, Yukio; Mori, Tamiki; Enomoto, Hiroshi; and Yoshikuni, Yoshiaki, 4,117,159, Cl. 424-309.000.

Nippon Steel Corporation: *See*—
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Itoh, Kametaro; Takahashi, Wataru; Yamamoto, Yoshun; and Harajiri, Hachiro, 4,116,716, Cl. 134-134.000.
Kataoka, Tohri; and Imi, Tetsuo, 4,116,367, Cl. 222-144.500.
Katoh, Hiroshi; Onoe, Yasumitsu; Akisue, Osamu; and Mochinaga, Kishio, 4,116,729, Cl. 148-111.000.

Nippondenso Co., Ltd.: *See*—
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Nishida, Takashi: *See*—
Mori, Fumio; Omura, Yoshiaki; Nishida, Takashi; and Itoi, Kazuo, 4,117,247, Cl. 568-845.000.

Nishikawa, Masaji; Suzuki, Yoshiro; and Takasugi, Noboru, to Olympus Optical Co., Ltd. Plate shaped development electrode. 4,116,141, Cl. 118-648.000.

Nishino, Yu: *See*—
Masuda, Noboru; Nishino, Yu; and Kase, Hiroaki, 4,117,523, Cl. 360-110.000.

Nissan Engineering Ltd.: *See*—
Kawasaki, Hideo; Nakatani, Masaji; Ishii, Toshihiro; Nakagawa, Hiroshi; and Takaya, Hiroshi, 4,117,080, Cl. 423-235.000.

Nissan Motor Company, Limited: *See*—
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Fujiki, Norio, 4,117,483, Cl. 343-8.000.
Hayashi, Yoshimasa; and Nakajima, Yasuo, 4,116,176, Cl. 123-119.00A.
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Nagumo, Shin-ichi; Hayashi, Yoshimasa; and Otsubo, Kizuku, 4,116,179, Cl. 123-119.00A.
Nakajima, Yasuo; and Hayashi, Yoshimasa, 4,116,181, Cl. 123-119.00A.

Nittetsu Chemical Industrial Co., Ltd.: *See*—
Sunago, Hirofumi; and Migitaka, Wataru, 4,116,815, Cl. 208-87.000.

Nitto Kasei Co. Ltd.: *See*—
Kitano, Yoshikazu, 4,117,029, Cl. 260-836.000.

Nixon, Jeddy D.; and Matson, Lawrence W., Jr., to Maurer Engineering, Inc. Shaft seal assembly and seal ring therefor. 4,116,451, Cl. 277-116.000.

Nnadi, John C.; and Heilweil, Israel J., to Mobil Oil Corporation. Multifunctional substituted triazine functional fluid additives and compositions containing same. 4,116,875, Cl. 252-49.700.

Noble, Wilfred R.: *See*—
Bistline, Raymond G., Jr.; Linfield, Warner M.; and Noble, Wilfred R., 4,116,986, Cl. 260-401.000.

Noda, Fumio; Mogi, Keitaro; and Sakasai, Toshio, to Kikkoman Shoyu Co. Ltd. Process for producing fermented liquid food products. 4,117,169, Cl. 426-7.000.

Noguchi, Hiroshi: *See*—
Yamada, Hirotada; Okamura, Kosaku; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,117,126, Cl. 424-246.000.

Nohira, Hidetaka; and Tanaca, Masaaki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Variable-venturi carburetor. 4,117,046, Cl. 261-44.00C.

Nolte, David G., to Westinghouse Canada Ltd. Sensitive J-tube and applications thereof. 4,116,076, Cl. 73-299.000.

Nomura, Hiroshi: *See*—
Kikura, Katsuaki; Nomura, Hiroshi; and Takeda, Kiyohiro, 4,116,190, Cl. 123-202.000.

Nomura, Kenichiro; Mori, Mamoru; Yasumatsu, Jun; Kubota, Tatsushi; Hachisuka, Sadao; and Tatematsu, Kazuhisa, to Toyota Jidosha Kogyo Kabushiki Kaisha; and Kabushiki Kaisha Tokai Rika Denki Seisakusho. Passenger restraining belt retractor. 4,116,402, Cl. 242-107.100.

Norfin, Inc.: *See*—
Lewis, Barry J.; Kuspert, John C.; Saunders, Arthur G.; and McAusland, Robert R., 4,116,750, Cl. 156-563.000.

Norlin Music, Inc.: *See—*
Moog, Robert A., 4,117,413, Cl. 330-126.000.

Norman, Barrie Edmund: *See—*
Amotz, Shmuel; Nielsen, Tage Kjaer; Poulsen, Poul Borge Rosenius; and Norman, Barrie Edmund, 4,116,771, Cl. 195-63.000.

Northup, Marcus Allen, Jr.: *See—*
Schoenholz, Daniel; Petersen, Arthur Walter; and Northup, Marcus Allen, Jr., 4,116,848, Cl. 252-90.000.

Northwest Orthodontics, Inc.: *See—*
Armstrong, Maclay M., 4,115,921, Cl. 32-14.00D.

Northwestern Equipment and Supply Co.: *See—*
Garello, David J., 4,116,374, Cl. 224-55.000.

Norton, David John, to Westinghouse Brake & Signal Co. Ltd. Circuit fault detection apparatus for railroad track circuit redundant connections. 4,117,463, Cl. 340-652.000.

Noshi, Yoshibumi: *See—*
Sugahara, Yujiro; Noshi, Yoshibumi; Naito, Hiroyuki; Saito, Mamoru; Takahashi, Akira; and Tuchida, Hisashi, 4,117,104, Cl. 423-619.000.

Noshiro, Makoto: *See—*
Yamabe, Masaaki; Arai, Kiyotaka; Samejima, Shunichi; and Noshiro, Makoto, 4,116,977, Cl. 260-343.600.

Novo Industri A/S: *See—*
Amotz, Shmuel; Nielsen, Tage Kjaer; Poulsen, Poul Borge Rosenius; and Norman, Barrie Edmund, 4,116,771, Cl. 195-63.000.

Noxell Corporation: *See—*
Shapiro, Warren B.; and Blackburne, Owen Rodney, 4,117,107, Cl. 424-54.000.
Shapiro, Warren B.; and Blackburne, Owen Rodney, 4,117,108, Cl. 424-54.000.

Nudelman, Boris Izrailovich: *See—*
Oborin, Pavel Alexandrovich; Gadaev, Anatoly Yakovlevich; Bikbau, Marsel Yanovich; Nudelman, Boris Izrailovich; Aronova, Irina Zelmanovna; Bulatov, Nail Yakubovich; and Sosenko, Lev Matveevich, 4,116,707, Cl. 106-104.000.

Nugent, Edward L.: *See—*
Mehl, Jack J.; and Nugent, Edward L., 4,116,066, Cl. 73-421.00R.

Nunokawa, Koji: *See—*
Abe, Nobuyuki; Watanabe, Osamu; Nunokawa, Koji; Tanaka, Ichiro; and Manabe, Masao, 4,116,012, Cl. 405-238.000.

Nuova San Giorgio S.p.A.: *See—*
Courvoisier, Guy, 4,116,395, Cl. 242-35.50A.

Nurnberg, Richard K., to Robertshaw Controls Company. Differential thermostatic controller for solar heating system. 4,116,219, Cl. 126-271.000.

Nustede, Fritz: *See—*
Kauf, Alois; Kandler, Georg; Rossmann, Axel; and Nustede, Fritz, 4,116,149, Cl. 113-116.00D.

O.E.M. Technical Sales, Inc.: *See—*
Jensen, William Kenneth, 4,116,065, Cl. 73-378.000.

Oakes, William J., to Nibble With Gibble's Inc. Oil separation and heat recovery system. 4,116,226, Cl. 126-299.00D.

Oakleaf, Sidney C.: *See—*
Dooley, Philip G., Jr.; and Oakleaf, Sidney C., 4,117,317, Cl. 235-307.000.

Oberpriller, Jakob, to Linde AG. Method of and apparatus for the cooling of articles with a circulated cooling gas. 4,116,017, Cl. 62-62.000.

Oborin, Pavel Alexandrovich; Gadaev, Anatoly Yakovlevich; Bikbau, Marsel Yanovich; Nudelman, Boris Izrailovich; Aronova, Irina Zelmanovna; Bulatov, Nail Yakubovich; and Sosenko, Lev Matveevich. Raw mixture for producing refractory aluminous cement. 4,116,707, Cl. 106-104.000.

O'Brien, Edwin L., to Hughes Aircraft Company. Signal sampling system. 4,117,409, Cl. 328-151.000.

O'Brien, Roger: *See—*
Winchester, Roy E.; Marjoran, Michael J.; and O'Brien, Roger, 4,116,430, Cl. 271-177.000.

Obsomer, Marc; Bodson, Luc; and Michel, Edmond, to SOLVAY, & Cie. Apparatus for the continuous production of oriented hollow bodies. 4,116,609, Cl. 425-526.000.

Occidental Petroleum Corporation: *See—*
Choi, Charles K., 4,116,823, Cl. 209-44.000.

Ochsner, Paul Albert, to Givaudan Corporation. N-2-Hydroxyethyloxazolidine compound. 4,116,970, Cl. 260-307.0FA.

Odle, Herbert Arnold, to Johns-Manville Corporation. Luminaire arrangement. 4,117,534, Cl. 362-378.000.

Oertel, Harald: *See—*
Buysch, Hans-Josef; Oertel, Harald; and Roos, Ernst, 4,116,932, Cl. 260-45.95R.

O'Farrell, Charles P.; Malloy, Paul L.; and Thompson, Francis M., to Exxon Research & Engineering Co. Butyl/resin blend latex used to coat polypropylene fabrics. 4,117,186, Cl. 428-265.000.

Offermanns, Heribert: *See—*
Klenk, Herbert; and Offermanns, Heribert, 4,117,008, Cl. 260-545.00R.

Ogasawara, Kazui: *See—*
Suzuki, Takashi; Ikezawa, Tsutomu; and Ogasawara, Kazui, 4,116,098, Cl. 83-425.400.

Ogawa, Masaya: *See—*
Tanaka, Susumu; Ogawa, Masaya; Kawabata, Hidetoshi; Fujiwara, Takao; Kurita, Takaji; Enoguchi, Yuji; Wada, Kenichi; and Murasaki, Hiroshi, 4,116,556, Cl. 355-3.0SH.

Ogino, Kiyoshi: *See—*
Mukai, Kunihiko; Mishima, Michiharu; Ogino, Kiyoshi; and Iseki, Shuichi, 4,116,656, Cl. 65-5.000.

Ogura, Motoshige: *See—*
Fujita, Yoshishige; Asagao, Soichi; and Ogura, Motoshige, 4,117,089, Cl. 423-306.000.

Ohashi, Azusa: *See—*
Mori, Teruo; and Ohashi, Azusa, 4,116,695, Cl. 96-86.00P.

Ohio Agricultural Research and Development Center: *See—*
Holmes, Robert G., 4,116,339, Cl. 209-699.000.

Ohio Machine Company, Inc.: *See—*
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Ohkubo, Kazuo: *See—*
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,117,127, Cl. 424-247.000.

Ohkubo, Kazuyoshi: *See—*
Tonouchi, Takeo; Tonouchi, Akio; Shiroshima, Makoto; Chimura, Yuichi; and Ohkubo, Kazuyoshi, 4,117,174, Cl. 426-634.000.

Ohmori, Muneki: *See—*
Isowa, Yoshikazu; Ohmori, Muneki; Kurita, Hideaki; Ichikawa, Tetsuya; Sato, Masanari; Mori, Kaoru; and Oyama, Kiyotaka, 4,116,768, Cl. 195-29.000.

Ohta, Takao: *See—*
Komeya, Katsutoshi; Inoue, Hiroshi; and Ohta, Takao, 4,117,095, Cl. 423-344.000.

Ohta, Yoshio; Matsuura, Toshiro; and Nakabe, Ryuhei, to Matsushita Electric Industrial Co., Ltd. Solid state color imaging apparatus. 4,117,510, Cl. 358-44.000.

Oil Spill Recovery, Inc.: *See—*
Stagemeyer, Merlin D.; and Allcorn, Seth Ford, 4,116,007, Cl. 405-66.000.
Stagemeyer, Merlin D.; and Allcorn, Seth Ford, 4,116,833, Cl. 210-83.000.

Oji Paper Co., Ltd.: *See—*
Gotoh, Hideo; Igarashi, Akira; Kobayashi, Reiko; and Akiho, Kiyotake, 4,117,199, Cl. 428-486.000.

Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, to Mitsubishi Chemical Industries Ltd.; and Shosuke Okamoto. N^2-Arylsulfonyl-L-argininamides and the pharmaceutically acceptable salts thereof. 4,117,127, Cl. 424-247.000.

Okamoto, Toyohiko; Misaka, Yoshisuke; and Asakawa, Motoo, to Sumitomo Metal Industries, Ltd. Rolling mill. 4,116,028, Cl. 72-21.000.

Okamura, Kosaku: *See—*
Yamada, Hirotada; Okamura, Kosaku; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,117,126, Cl. 424-246.000.

Okaniwa, Shigeru: *See—*
Kobayashi, Yoshiyuki; and Okaniwa, Shigeru, 4,116,030, Cl. 72-40.000.

Okidata Corporation: *See—*
San Pietro, Craig, 4,116,567, Cl. 400-124.000.

Okuno, Toshio, to Hitachi Metals, Ltd. Tool steel for warm and hot working. 4,116,685, Cl. 75-128.00B.

Olah, George A., to Produits Chimiques Ugine Kuhlmann. Solid catalysts based on fluorinated graphite. 4,116,880, Cl. 252-429.00R.

Olin Corporation: *See—*
Knollmueller, Karl O., 4,116,847, Cl. 252-78.300.
Kongpricha, Santad, 4,117,091, Cl. 423-320.000.
Mravic, Brian; Shapiro, Stanley; Tyler, Derek E.; and Khan, Abid, 4,116,686, Cl. 75-154.000.

Olivo, Anthony Robert; Soldatos, Anthony Constantine; and Schultz, Sidney Joseph, to Union Carbide Corporation. Novel thermosetting molding composition. 4,116,921, Cl. 260-38.000.

Olsen, Gregory Hammond; Zamerowski, Thomas Joseph; and Buiocchi, Charles Joseph, to RCA Corporation. Vapor phase growth technique of III-V compounds utilizing a preheating step. 4,116,733, Cl. 148-175.000.

Olson, David H.: *See—*
Haag, Werner O.; and Olson, David H., 4,117,026, Cl. 260-671.00R.

Olsson, Sten Yngve: *See—*
Backman, Torsten Lorentz; and Olsson, Sten Yngve, 4,116,617, Cl. 431-186.000.

Olympus Optical Co., Ltd.: *See—*
Kitahara, Tomohiro, 4,116,637, Cl. 422-63.000.
Morokuma, Tadashi; and Fujimori, Ryo, 4,116,559, Cl. 355-28.000.
Nishikawa, Masaji; Suzuki, Yoshiro; and Takasugi, Noboru, 4,116,141, Cl. 118-648.000.
Tojyo, Tsutomu; and Sato, Shozo, 4,116,753, Cl. 156-629.000.

Omori, Mamoru: *See—*
Yajima, Seishi; Hayashi, Josaburo; and Omori, Mamoru, 4,117,057, Cl. 264-63.000.

Omura, Yoshiaki: *See—*
Mori, Fumio; Omura, Yoshiaki; Nishida, Takashi; and Itoi, Kazuo, 4,117,247, Cl. 568-845.000.

Ondetti, Miguel Angel; and Weisenborn, Frank Lee, to E. R. Squibb & Sons, Inc. Pyrrolidine and piperidine-2-carboxylic acid derivatives. 4,116,962, Cl. 260-293.630.

O'Neill, Eugene Edward, to United States Gypsum Company. Process for preparing calcined gypsum. 4,117,070, Cl. 264-234.000.

Onizuka, Shigenori: *See—*
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Ono Pharmaceutical Company: *See*—
Kurono, Masayasu; Nakai, Hisao; and Muryobayashi, Takashi, 4,117,119, Cl. 424-180.000.
Ono, Yutaka; Fujii, Yoichi; Yokoyama, Koji; and Igarashi, Toshifumi, to Ono, Yutaka; Fuji, Yoichi; and Eto, Goro. Method and apparatus for measuring electric quantities by using light converters. 4,117,399, Cl. 324-96.000.
Onoe, Yasumitsu: *See*—
Katoh, Hiroshi; Onoe, Yasumitsu; Akisue, Osamu; and Mochinaga, Kishio, 4,116,729, Cl. 148-111.000.
Onosovsky, Evgeny Valentinovich: *See*—
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.
Ontario Energy Corporation: *See*—
Kizior, Thaddeus Eugene, 4,116,809, Cl. 208-11.0LE.
Optel Corporation: *See*—
Deb, Satyendra K.; Chen, Schoen-nan; Witzke, Horst; Russak, Michael A.; and Reichman, Joseph, 4,117,210, Cl. 429-111.000.
Optical Associates, Incorporated: *See*—
Bachur, Gerald; and Richardson, George E., 4,117,375, Cl. 315-151.000.
O'Rear, Jacques G.: *See*—
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Orekhov, Alexandr Mikhailovich: *See*—
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.
O'Rell, Michael K.: *See*—
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Orlando, Charles M.: *See*—
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Orsco, Inc.: *See*—
Glaser, Marshall H.; and Jeakle, Patrick L., 4,116,475, Cl. 285-133.00R.
Orshansky, Elias, Jr. deceased; and Weseloh, William E., to Orshansky Transmission Corporation. Hydromechanical transmission. 4,116,089, Cl. 74-687.000.
Orshansky Transmission Corporation: *See*—
Orshansky, Elias, Jr. deceased; and Weseloh, William E., 4,116,089, Cl. 74-687.000.
Ort, Werner, to Hottinger Baldwin Messtechnik GmbH. Mechanical to electrical transducer. 4,116,075, Cl. 73-708.000.
Ortabasi, Ugur, to Corning Glass Works. Solar energy collector. 4,116,225, Cl. 126-271.000.
Orth, Harold R., to International Harvester Company. Simplified load sensitive hydraulic system for use with a vehicle steering system. 4,116,001, Cl. 60-420.000.
Osburn, Carlton Morris: *See*—
Ning, Tak Hung; Osburn, Carlton Morris; and Yu, Hwa Nien, 4,116,721, Cl. 148-1.500.
Osiko, Vyacheslav Vasilievich: *See*—
Alexandrov, Vladimir Ilich; Osiko, Vyacheslav Vasilievich; Tatarintsev, Vladimir Mikhailovich; and Udovenchik, Viktor Timofeevich, 4,116,598, Cl. 425-174.80R.
Osipow, Lloyd I.: *See*—
Spitzer, Joseph George; Small, Marvin; Osipow, Lloyd I.; and Marra, Dorothea C., 4,116,370, Cl. 222-402.180.
Oskam, Aane Adriaan, to Industrie Koot B.V. Motor-car mirror adjustable about two perpendicular axes. 4,116,538, Cl. 350-289.000.
Osmalov, Jerome S.: *See*—
Mathe, George L.; and Osmalov, Jerome S., 4,117,064, Cl. 264-103.000.
Osterwalder AG: *See*—
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Othmer, Donald F. Solvent refining of sugar. 4,116,712, Cl. 127-46.00R.
Otrhalek, Joseph V.; Gomes, Gilbert S.; and Gansser, Robert E., to BASF Wyandotte Corporation. Acid cleaner and process for disposal thereof. 4,116,713, Cl. 134-3.000.
Otsubo, Kizuku: *See*—
Nagumo, Shin-ichi; Hayashi, Yoshimasa; and Otsubo, Kizuku, 4,116,179, Cl. 123-119.00A.
Ott, Eduard Karl. Solid state alternating current switching device. 4,117,349, Cl. 307-252.00B.
Ottesen, Otto, to ASEA Aktiebolag. Top core type current transformer structure. 4,117,437, Cl. 336-69.000.
Outten, Edward Francis; Ryer, Jack; and Williams, John E., to Exxon Research & Engineering Co. Elastomer compatible seal swell additive for automatic transmission fluids, power transmission fluids and hydraulic steering applications. 4,116,877, Cl. 252-72.000.
Ovation Instruments, Inc.: *See*—
Rickard, James H., 4,116,107, Cl. 84-267.000.
Owen, Ronald C.; and Curry, John C., to Plastisonics Company, Inc. Foldable hair brush. 4,116,205, Cl. 132-85.000.
Owens-Corning Fiberglas Corporation: *See*—
Charon, Clarence W.; and Renaud, Laurent C., 4,115,917, Cl. 29-611.000.
Charter, Kenneth F.; Miller, John R.; and Garrett, David W., 4,117,067, Cl. 264-119.000.
Stanley, Marion L., Jr., 4,116,357, Cl. 220-205.000.
Owens-Illinois, Inc.: *See*—
Byrum, Bernard W., Jr., 4,116,792, Cl. 204-192.00E.
Taylor, Lynn J., 4,117,235, Cl. 560-205.000.
Uhlig, Albert R., 4,116,608, Cl. 425-525.000.
Uhlig, Albert R., 4,117,062, Cl. 264-94.000.
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Oyama, Kiyotaka: *See*—
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Oyama, Shiro: *See*—
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P.I.V. Antrieb Werner Reimers Kommanditgesellschaft: *See*—
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P.R.A. Laboratories Incorporated: *See*—
Lietz, Dennis E.; and Kinney, Layton F., 4,116,903, Cl. 260-22.0CB.
Packard Instrument Company, Inc.: *See*—
Kaartinen, Niilo H.; and Juhala, Pentti J., 4,116,632, Cl. 23-230.0PC.
Pacor, Bruno, to SGS-ATES Componeti Elettronici S.p.A. Diode formed in integrated-circuit structure. 4,117,507, Cl. 357-48.000.
Pall Corporation: *See*—
Cooper, Roydon B., 4,116,212, Cl. 137-220.000.
Pall, David B., 4,116,738, Cl. 156-167.000.
Pall, David B., to Pall Corporation. Continuous production of tubular modular filter elements using nonwoven webs from thermoplastic fibers and products. 4,116,738, Cl. 156-167.000.
Palmer-Shile Company: *See*—
Hall, Lee Z., 4,116,343, Cl. 211-151.000.
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Panchak, John R.: *See*—
Bechara, Ibrahim S.; Carroll, Felix P.; Mascioli, Rocco L.; and Panchak, John R., 4,116,879, Cl. 252-426.000.
Panicci, Richard L., to Kiddie Products, Inc. Teether with pressurized fluid. 4,116,202, Cl. 128-359.000.
Pankratz, David V.; and Wright, Bruce E., to Aerovironment Inc. Fluid sampling devices. 4,116,067, Cl. 73-421.50R.
Papillon, Jean-Guy: *See*—
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Papillon, Paul: *See*—
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Harris, Harry A., 4,116,779, Cl. 201-34.000.
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Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, 4,116,818, Cl. 208-210.000.
Frayer, James Albert; Lese, Henri K.; McKinney, Joel Drexler; Metzger, Kirk J.; and Paraskos, John Angelo, 4,116,819, Cl. 208-216.000.
Parenti, Ronald. Toothbrush with cartridge chamber. 4,116,570, Cl. 401-155.000.
Parish, Ben D.: *See*—
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Parton, Kenneth Charles; Appleton, Anthony Derek; and Bartram,

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Pasqualucci, Carmine: *See—*
Rossetti, Vittorio; Marsili, Leonardo; and Pasqualucci, Carmine, 4,116,957, Cl. 260-239.30P.

Pate, James O.: *See—*
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Patel, Amrut R.: *See—*
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Patel, Raman P.: *See—*
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Paterson, Thomas: *See—*
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Pauer, Lyle A.: *See—*
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Paulus, Paul. Flush valve for toilet tanks. 4,115,882, Cl. 4-327.000.

Pavel, Klaus, to Rhein-Nadel Maschinennadel GmbH. Dispenser for sewing machine needles or the like. 4,116,333, Cl. 206-380.000.

Pawson, Beverly Ann: *See—*
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Paz, Eldad: *See—*
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Pearce, James D.; Pearce, Stanley E.; and Pearce, D. Kevin. Chain drive shift system. 4,116,079, Cl. 74-217.00B.

Pearce, Stanley E.: *See—*
Pearce, James D.; Pearce, Stanley E.; and Pearce, D. Kevin, 4,116,079, Cl. 74-217.00B.

Pearson, James M.: *See—*
Stolka, Milan; Pearson, James M.; and Yanus, John F., 4,117,239, Cl. 560-221.000.

Pearson, Kenneth White; and Richards, David William Thomas, to Shipowners Refrigerated Cargo Research Association. Flexible couplings for providing fluid communication between two members. 4,116,418, Cl. 251-149.200.

Pechmeze, Jacques Pierre Edmond: *See—*
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Peck, John Alexander, to Radionic Products Limited. Box camera and photographic kit. 4,117,501, Cl. 354-89.000.

Peecher, Ronald Kaye, to International Telephone and Telegraph Corp. Sound communication system. 4,117,262, Cl. 179-1.0SW.

Peek, Henry L.: *See—*
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Pegram, John B.: *See—*
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Peiser, Alfred M., to Mobil Oil Corporation. Method and apparatus for processing a petroleum production stream. 4,116,821, Cl. 208-361.000.

Pelzer, Peter: *See—*
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Pencak, John George, to American Can Company. Electronic detection apparatus for leaks. 4,116,043, Cl. 73-40.000.

Penfold, Alan S.; and Thornton, John A., to Telic Corporation. Glow discharge method and apparatus. 4,116,793, Cl. 204-192.00R.

Penfold, Alan S.; and Thornton, John A., to Telic Corporation. Glow discharge method and apparatus. 4,116,794, Cl. 204-192.00R.

Pennwalt Corporation: *See—*
Vidal, Frederick D.; and Gerrity, Albert B., 4,116,772, Cl. 195-64.000.

Pereny, Franklin C., to Truxell, Stanley, a part interest. Vibrator. 4,117,381, Cl. 318-120.000.

Pering, Richard D., to Hewlett-Packard Company. Acoustic imaging apparatus. 4,116,229, Cl. 128-2.00V.

Peripheral Dynamics, Inc.: *See—*
Schisselbauer, John C.; and Dobson, John J., 4,117,314, Cl. 235-475.000.

Permali, Incorporated: *See—*
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Pernet, Andre G.; Nakamoto, Hiromasa; and Ishizuka, Naoyasu, to Abbott Laboratories. Prostaglandin derivatives. 4,117,014, Cl. 260-586.00R.

Peroxid-Chemie GmbH.: *See—*
Dillenburg, Helmut; Moser, Wilhelm; and Jones, Robert, 4,117,087, Cl. 423-275.000.

Perrault, Guy; Francoeur, Raynald; and Lavertu, Roger, to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Composite explosives. 4,116,734, Cl. 149-19.200.

Perrotti, Emmanual Joseph, to International Telephone and Telegraph Corp. Multipurpose, multifunction antenna. 4,117,488, Cl. 343-100.0PE.

Perry, Anthony J.: *See—*
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Persson, Staffan B., to American Optical Corporation. Adjustable support. 4,116,548, Cl. 351-38.000.

Persson, Staffan B., to American Optical Corporation. Control means. 4,117,341, Cl. 250-561.000.

Pesola, Oiva J. Ski vise. 4,116,425, Cl. 269-152.000.

Peter, Friedrich G.: *See—*
Farfaletti-Casali, Falviano; Peter, Friedrich G.; and Gritzmann, Peter G., 4,116,264, Cl. 165-47.000.

Peters, Edward J., to Diamond Shamrock Corporation. Explosion bonding of bipolar electrode backplates. 4,116,807, Cl. 204-290.00F.

Petersen, Arthur Walter: *See—*
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Petersen, Egon Norbert; and Richtzenhain, Hermann, to Dynamit Nobel Aktiengesellschaft. Arylsulfonic acid bromophenyl esters, their preparation, and their use as flameproofing agents. 4,116,934, Cl. 260-45.75B.

Peterson, Vacharee S. Toothbrush for simultaneous-surface and sulcus cleaning. 4,115,894, Cl. 15-167.00R.

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Petro-Data C.A.: *See—*
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Petro, John; and Schofield, Charles R., to Westinghouse Electric Corp. Method of tipping refractory metal tubulation. 4,117,299, Cl. 219-117.100.

Petroff, Peter D. Sewer line analyzer probe. 4,116,061, Cl. 73-299.000.

Petrolite Corporation: *See—*
Godar, Richard L.; and Corneli, Philip R., 4,116,812, Cl. 208-48.0AA.
Redmore, Derek, 4,117,236, Cl. 560-129.000.

Pettijohn, David, to Midgard Electronics Company, Inc. High voltage constant current source for iontophoresis. 4,116,238, Cl. 128-172.100.

Pfeiffer, Willi: *See—*
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Pfizer Inc.: *See—*
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Hammen, Philip D.; and Milne, George M., Jr., 4,117,012, Cl. 260-570.80R.
Nelson, Albin J., 4,117,138, Cl. 424-263.000.
Sarges, Reinhard, 4,117,230, Cl. 548-309.000.

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Phillips Cable Limited: *See—*
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Drake, Charles A., 4,117,002, Cl. 260-465.80R.
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Fozzard, George B., 4,117,001, Cl. 260-465.80R.
Fozzard, George B., 4,117,242, Cl. 560-263.000.
Habeger, Charles C., Jr.; and Irwin, Michael J., 4,117,473, Cl. 340-324.0AD.
Hsieh, Henry L., 4,116,869, Cl. 252-431.00P.
Hughes, William B., 4,117,016, Cl. 260-593.00R.
Liebert, Timothy C.; and McClintock, William A., 4,117,025, Cl. 260-681.500.

Phillips, Robert, to A. & E. Warbern, Inc. Garment hanger with size indicator. 4,115,940, Cl. 40-322.000.

Phillips, Ronald; and Melville, James Campbell, to Lucas Industries Limited. Fluid pump. 4,116,588, Cl. 417-252.000.

Pierrel, Michel, to Pont-A-Mousson S.A. Installation for the centrifugal casting of large pipes. 4,116,260, Cl. 164-295.000.

Pietsch, Wolfgang B., to Midrex Corporation. Metallized iron briquet. 4,116,679, Cl. 75-34.000.

Pigeon Kabushiki Kaisha: *See—*
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Pike, Russell E.: *See—*
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Pillar, Walter O., to ARCO Polymers, Inc. Phenolic antioxidants for non-polymeric halogen compounds during impregnation of styrene polymer particles. 4,117,178, Cl. 521-60.000.

Pincherle, Hugh Andrew: *See—*
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Pioneer Electronic Corporation: *See—*
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Pioneer Filters, Inc.: *See—*
Swank, Roy L., 4,116,845, Cl. 210-446.000.

Pioneer Industries, Div. of Core Industries Inc.: *See—*
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Pirovano, Camillo; and Pirovano, Camillo. Cable terminals for metal cables. 4,116,574, Cl. 403-275.000.
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Pitman-Moore, Inc.: *See*—
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Pizzorno, Augusto, to Industrie Pirelli S.p.A. Contractible segmented rigid core for a tire-curing mold. 4,116,596, Cl. 425-55.000.
Plains Chemical Development Co.: *See*—
Budnick, Edward G., 4,116,990, Cl. 260-429.00J.
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Rubin, Mae K.; Rosinski, Edward J.; and Plank, Charles J., 4,116,813, Cl. 208-46.000.
Plantema, Otto G., to Stamicarbon, B.V. Process for preparing a cycloalkanol. 4,117,246, Cl. 568-821.000.
Plasco, Inc.: *See*—
Eisenberg, Melvin I.; Levy, Norman; and Beall, Glenn L., 4,116,227, Cl. 128-2.00F.
Plasse, Robert. Method for the manufacture of a spring-interior mattress. 4,116,735, Cl. 156-79.000.
Plastisonics Company, Inc.: *See*—
Owen, Ronald C.; and Curry, John C., 4,116,205, Cl. 132-85.000.
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Playart Ltd.: *See*—
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Pleier, Walter J.; and Wahl, James A., to Eaton Corporation. Automatic seat brake. 4,116,296, Cl. 180-101.000.
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Pleskac, Larry J., to NCR Corporation. Clip for paralleling packaged integrated circuit chips. 4,116,518, Cl. 339-17.0CF.
Ploger, Walter, to Henkel Kommanditgesellschaft auf Aktien. Process of stabilization of dibasic calcium phosphate dihydrate against hydrolysis with 3-amino-1-hydroxypropane-1,1-diphosphonic acid. 4,117,086, Cl. 423-268.000.
Ploger, Walter, to Henkel Kommanditgesellschaft auf Aktien. Process of stabilization of dibasic calcium phosphate dihydrate against hydrolysis with azacycloalkane-2,2-diphosphonic acids. 4,117,090, Cl. 423-268.000.
Plust, Heinz; and Gutmann, Gunter, to Deutsche Automobilgesellschaft GmbH. Nickel oxide-hydrogen cell. 4,117,206, Cl. 429-101.000.
Ply, Lemuel Leslie. Tubular pneumatic conveyor pipeline. 4,116,491, Cl. 302-29.000.
Poe, L. Richard, to Hartwell Corporation. Adjustable flush mounted hook latch. 4,116,479, Cl. 292-113.000.
Poiget, Gilbert: *See*—
Farge, Daniel; Leboul, Jean; Le Goff, Yves; and Poiget, Gilbert, 4,116,974, Cl. 260-332.20A.
Poindexter, Allan M.; and Ricks, Herbert E., to United States of America, Energy. Ultrasonic dip seal maintenance system. 4,116,766, Cl. 176-38.000.
Policke, Oswald: *See*—
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Polito, Carole A., to Beckman Instruments, Inc. Enzymatic reagent and method for increasing the sensitivity of enzymatic substrate analyses using oxygen rate analyzers. 4,116,773, Cl. 195-99.000.
Polk, Donald E.; and Giessen, Bill C. Amorphous metal alloys and products thereof. 4,116,682, Cl. 75-123.00H.
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Pommer, Ernst-Heinrich; Thym, Sabine; and Reuther, Wolfgang, to BASF Aktiengesellschaft. Furan derivatives. 4,117,150, Cl. 424-285.000.
Pond, David Martin, to Eastman Kodak Company. Ultraviolet stabilizers and their use in organic compositions. 4,116,929, Cl. 260-45.8NT.
Pondrom, Walter L., Jr., to United States of America, Air Force. Optical position pick-off in zero-drag satellite. 4,117,318, Cl. 250-201.000.
Ponjee, Johannes Jacobus; and Bruinink, Jacob, to U.S. Philips Corporation. Picture display cell with memory effect. 4,116,535, Cl. 350-355.000.
Pont-A-Mousson S.A.: *See*—
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Poole, Ernest G.; and Hair, Lucius M., to Kendall Company, The. Method of making retipped top-drive filling spindles. 4,115,911, Cl. 29-401.00D.
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Popovich, David Thomas: *See*—
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Porter, Gary K.; and Porter, George K., Jr. Quick disconnect coupler assembly. 4,116,476, Cl. 285-137.00R.
Porter, George K., Jr.: *See*—
Porter, Gary K.; and Porter, George K., Jr., 4,116,476, Cl. 285-137.00R.
Porth, Chris H.; and Lilja, E. Harold, to Skil Corporation. Belt centering and replacement mechanism for belt sanders and the like. 4,115,957, Cl. 51-170.0EB.
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Potter, Bronson M. Oil detector. 4,116,045, Cl. 73-61.10R.
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Powell, William E.; and Magner, Richard G., to Corning Glass Works. Electrophoretic analyzer with automatic reference circuit. 4,116,565, Cl. 356-105.000.
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Power Instruments, Inc.: *See*—
Redfield, Robert H., 4,117,395, Cl. 324-16.00T.
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Pozuelo, Jose. Method of pharmacologically treating drug addiction with alpha-methyl-para-tyrosine. 4,117,161, Cl. 424-319.000.
PPG Industries, Inc.: *See*—
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Edge, Charles K.; and Nier, Thomas J., 4,116,661, Cl. 65-182.00R.
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Prater, J. Lewis; and Hedworth, Robert L., to GAF Corporation. Continuous, low pressure ethynylation process for the production of butynediol. 4,117,248, Cl. 568-855.000.
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Prest, William M., Jr, to Xerox Corporation. Process for enhancement of mechanical properties of photoconductive polymers. 4,117,072, Cl. 264-288.000.
Prestridge, Floyd Leon, to Combustion Engineering, Inc. Method and apparatus for separation of fluids with an electric field and centrifuge. 4,116,790, Cl. 204-188.000.
Prestwich, John Richard, to Warwick Pump and Engineering Company Limited. Disphragm pump with pulse piston position responsive work fluid replenishment. 4,116,590, Cl. 417-387.000.
Previt:, Robert W., to W. R. Grace & Co. Additive composition for hydraulic cement compositions. 4,116,706, Cl. 106-90.000.
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Rupe, Lewis Allen; Tuthill, Lyle Brown; and Leikhim, John William, 4,116,851, Cl. 252-103.000.
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Puhringer, Othmar; and Scheurecker, Werner, to Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft. Continuous casting plant strand guiding means. 4,116,261, Cl. 164-448.000.
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Rahilly, William P., to United States of America, Air Force. Ion implanted eutectic gallium arsenide solar cell. 4,116,717, Cl. 136-89.0SJ.
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Rambert, Andre; Bousquet, Gilles; and Dejour, Henri. Hip prosthesis. 4,115,875, Cl. 3-1.913.
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Ramey, Chester E.; and Luzzi, John J., to Ciba-Geigy Corporation. Hindered piperidine carboxylic acids, metal salts thereof and stabilized compositions. 4,116,933, Cl. 260-45.75N.
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Raytheon Company: *See*—
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Razdan, Raj Kumar; and Dalzell, Haldean Cloyce, to Sheehan Institute for Research, Inc. Process for the preparation of (−)-6a,10a-trans-6a,7,8,10a-tetrahydrodibenzo[b,d]-pyrans. 4,116,979, Cl. 260-345.300.
Razgaitis, Frank V.: *See*—
Greaves, Melvin J.; and Razgaitis, Frank V., 4,116,345, Cl. 214-37.000.
RCA Corporation: *See*—
Ahmed, Adel Abdel Aziz, 4,117,417, Cl. 330-288.000.
Carlson, David Emil; and Wronski, Christopher Roman, 4,117,506, Cl. 357-30.000.
Clay, Burton Ross; and Burton, Gardner Thomas, 4,116,526, Cl. 350-3.670.
den Hollander, Willem, 4,117,380, Cl. 315-393.000.
Ganssle, Eugene Robert; Scott, Ralph Richard; and Williams, Richard Jean, 4,116,263, Cl. 165-27.000.
Goel, Jitendra; Narayan, Subrahmanyam Yegna; and Drukier, Ira, 4,117,301, Cl. 219-121.0EM.
Hoover, Merle Vincent, 4,117,415, Cl. 330-264.000.
Kalfus, Martin Aaron; and Becke, Hans Werner, 4,117,350, Cl. 307-252.00C.
Kalfus, Martin Aaron; and Baugher, Dale Milton, 4,117,351, Cl. 307-252.00C.
Marlowe, Frank Jerome; and Anderson, Charles Hammond, 4,117,368, Cl. 313-422.000.
Olsen, Gregory Hammond; Zamerowski, Thomas Joseph; and Buiocchi, Charles Joseph, 4,116,733, Cl. 148-175.000.
Schade, Otto Heinrich, Jr., 4,117,416, Cl. 330-282.000.
Smith, Joseph Leland, 4,117,433, Cl. 335-212.000.
Reagents of the University of California, The: *See*—
Goodman, Murray; Verlander, Michael S.; Kaplan, Nathan O.; and Venter, J. Craig, 4,116,949, Cl. 260-112.50R.
Reddy, Thomas Bradley, to American Cyanamid Company. Polymeric electrolyte for electrochromic display devices. 4,116,545, Cl. 350-357.000.
Redfield, Robert H., to Power Instruments, Inc. Digital stroboscope-tachometer. 4,117,395, Cl. 324-16.00T.
Redland Claddings Limited: *See*—
Cummins, Peter Gerald; Sinton, Bernard; and Miller, Michael George, 4,117,185, Cl. 428-241.000.

Redmore, Derek, to Petrolite Corporation. Phosphonium compounds. 4,117,236, Cl. 560-129.000.
Reed, Meuriel Francis; and Malm, Curtis Lawrence, to Gillette Company, The. Ball holder for a ball-point pen. 4,116,569, Cl. 401-216.000.
Reed, Ronald H.; Miracle, William C.; and McMullin, Dwain G., to Square D Company. Meter receptacle assembly. 4,117,530, Cl. 361-365.000.
Reed, William H., III: *See*—
Berkey, Edgar; Reed, William H., III; and Hickam, William M., 4,117,396, Cl. 324-33.000.
Reeves, Adam A.: *See*—
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Refreshment Machinery Incorporated: *See*—
Meacham, Thomas E., Jr.; and Johnson, David C., 4,116,630, Cl. 422-24.000.
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Regel, Erik: *See*—
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Rehm, John A.: *See*—
Zimmerman, Gary Lee; Clark, Richard Paul; and Rehm, John A., 4,116,520, Cl. 339-59.00R.
Rehn, Gary Allen; and Taube, Robert Otto, to Deere & Company. Spring reset mechanism. 4,116,280, Cl. 172-266.000.
Reichenbacher, Frank W., to Armour Pharmaceutical Company. Freeze-dry process and product. 4,115,928, Cl. 34-5.000.
Reichman, Joseph: *See*—
Deb, Satyendra K.; Chen, Schoen-nan; Witzke, Horst; Russak, Michael A.; and Reichman, Joseph, 4,117,210, Cl. 429-111.000.
Reinecke, Erich, to WABCO Westinghouse GmbH. Fluid pressure operated disc brake having service, auxiliary and parking brake systems. 4,116,307, Cl. 188-106.00P.
Reinecke, Erich, to WABCO Westinghouse GmbH. Brake valve arrangement for a two-circuit brake system. 4,116,492, Cl. 303-22.00R.
Reinke, Orville Harold: *See*—
Adams, James William; and Reinke, Orville Harold, 4,117,187, Cl. 428-286.000.
Reip, Raymond G., to Vapor Corporation. Removable tank gauge float. 4,116,062, Cl. 73-321.000.
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Remington Arms Company, Inc.: *See*—
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Renaud, Laurent C.: *See*—
Charon, Clarence W.; and Renaud, Laurent C., 4,115,917, Cl. 29-611.000.
Renaud, Serge; and Rubel, Jean-Paul, to Institut National de la Sante et de la Recherche Medicale Inserm. Apparatus for the study of plasmas. 4,116,564, Cl. 356-39.000.
Rengel, Richard J.: *See*—
Gerlach, Richard K., 4,117,265, Cl. 179-1.0SP.
Research Corporation: *See*—
Goering, Kenneth J.; and Eslick, Robert, 4,116,770, Cl. 195-63.000.
Kende, Andrew S., 4,116,981, Cl. 260-346.710.
Research Incorporated: *See*—
Kintigh, Stanley S.; and Lilienthal, Clarence D., 4,117,392, Cl. 323-21.000.
Research Institute for Iron, Steel and Other Metals of the Tohoku University, The: *See*—
Yajima, Seishi; Hayashi, Josaburo; and Omori, Mamoru, 4,117,057, Cl. 264-63.000.
Reusser, Raymond Edward: *See*—
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Reuther, Wolfgang: *See*—
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Revells, Robert G., to Libbey-Owens-Ford Company. Glass sheet supporting and conveying apparatus. 4,116,662, Cl. 65-289.000.
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Reynolds, Charles Edward, to AMP Incorporated. Slotted terminal. 4,116,522, Cl. 339-97.00R.
Reyrolle Parsons Limited: *See*—
Parton, Kenneth Charles; Appleton, Anthony Derek; and Bartram, Trevor Carlisle, 4,117,524, Cl. 361-19.000.
Rhein-Nadel Maschinennadel GmbH: *See*—
Pavel, Klaus, 4,116,333, Cl. 206-380.000.
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Schulten, Rudolf; and Behr, Friedrich, 4,117,102, Cl. 423-579.000.
Rheocast Corporation: *See*—
Bennett, Foster C., 4,116,423, Cl. 266-200.000.
Rhodes, James F., to General Motors Corporation. Catalyst support coating slurry and coatings. 4,116,883, Cl. 252-463.000.
Rhone-Poulenc-Textile: *See*—
Barbe, Gerard; and Habault, Robert, 4,117,194, Cl. 428-374.000.
Couchoud, Paul, 4,117,042, Cl. 260-930.000.
Ducarre, Michel, 4,116,943, Cl. 528-292.000.
Ribka, Joachim: *See*—
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Ricards, Charles R., to GTE Sylvania Incorporated. Redundant welding method for metal battery containers. 4,117,300, Cl. 219-121.0LM.
Richard Arbib Company, Inc.: *See*—
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Richards, David William Thomas: *See*—
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Richardson, George E.: *See*—
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Richardson, James L., to VEDA, Inc. Valve assembly. 4,116,211, Cl. 137-205.000.
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Freedman, Jules, 4,117,122, Cl. 424-244.000.
Richardson, Philip C.: *See*—
Hudspeth, Emmett L.; Richardson, Philip C.; Neathery, John L., Jr.; Dykstra, Jerald P.; Boger, Allen D., Jr.; Sims, William B., Jr.; Hunt, Glenn E.; and Quisenberry, Tony M., 4,116,228, Cl. 128-2.00R.
Richter, Artur. Device for passing electric current through a wall subjected to excess pressure on its inner side. 4,117,254, Cl. 174-15.0BH.
Richter, David J.: *See*—
Teeter, Wallis L.; and Richter, David J., 4,117,271, Cl. 179-82.000.
Richter, Eike, to General Electric Company. Self-supporting amortisseur cage for high-speed synchronous machine solid rotor. 4,117,360, Cl. 310-183.000.
Richter, Sidney B.: *See*—
Stach, Leonard J.; Hotz, Roger D.; and Richter, Sidney B., 4,116,670, Cl. 71-88.000.
Richtzenhain, Hermann: *See*—
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Rickard, James H., to Ovation Instruments, Inc. Stringed instrument mute mechanism. 4,116,107, Cl. 84-267.000.
Rickert, Glenn E. Heat sink temperature stabilized evaporator coil. 4,116,651, Cl. 62-59.000.
Ricks, Herbert E.: *See*—
Poindexter, Allan M.; and Ricks, Herbert E., 4,116,766, Cl. 176-38.000.
Ricoh Co., Ltd.: *See*—
Machida, Hazime; Tamura, Hiroshi; and Murakami, Kakuji, 4,116,698, Cl. 106-2.000.
Suzuki, Takami; Suzaki, Masayuki; and Moriya, Tomoyuki, 4,116,568, Cl. 400-320.000.
Riedel, Konrad: *See*—
Fechner, Joachim; Fiebig, Siegward; Fischer, Friedrich; Fischer, Herbert; Hellmer, Lars; Riedel, Konrad; Stauffer, Adolf; and Sud, Kuldip, 4,117,101, Cl. 423-569.000.
Rieter Machine Works, Ltd.: *See*—
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Riganti, Gian Piero: *See*—
Todeschini, Eugenio; and Riganti, Gian Piero, 4,116,292, Cl. 180-6.480.
Rinehart, Jay Kent, to PPG Industries, Inc. Control of *Pythium ultimum* with S-methoxy- or S-3-methylthiophenyl N-alkylthiolcarbamates. 4,117,155, Cl. 424-300.000.
Rishton, Michael L., to Avco Corporation. Extracorporeal pulsatile blood pump comprised of side by side bladders. 4,116,589, Cl. 417-384.000.
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Ritter, Josef; Sackl, Alois; Ritter, Klaus; and Ritter, Gerhard, 4,116,244, Cl. 140-112.000.
Ritter, Josef; Sackl, Alois; Ritter, Klaus; and Ritter, Gerhard, to EVG Entwicklungs-u. Verwertungs- GmbH. Multispot welding machine. 4,116,244, Cl. 140-112.000.
Ritter, Klaus: *See*—
Ritter, Josef; Sackl, Alois; Ritter, Klaus; and Ritter, Gerhard, 4,116,244, Cl. 140-112.000.
Roach, James F.: *See*—
Gorman, Joseph G.; Roach, James F.; and Wayland, Paul O., 4,117,288, Cl. 200-144.00R.
Robbins, Jeffrey D.: *See*—
Fancher, Llewellyn W.; and Robbins, Jeffrey D., 4,117,043, Cl. 260-938.000.
Robert Bosch GmbH: *See*—
Fleischer, Helmut, 4,117,355, Cl. 307-310.000.
Glauert, Wolfram, 4,117,401, Cl. 324-208.000.
Iwata, Yoriaki; and Sato, Suguru, 4,117,390, Cl. 322-90.000.
Roberts, Bruce D., to Central States Tooling Service, Inc. Automatic ribbon winding machine. 4,116,398, Cl. 242-56.00R.
Roberts, Fred: *See*—
Magnall, Anthony N.; Taylor, Philip H.; and Roberts, Fred, 4,115,991, Cl. 57-153.000.
Robertshaw Controls Company: *See*—
Bible, Harley V.; Goff, Clifford E.; and Moon, William T., Jr., 4,116,155, Cl. 116-65.000.
Nurnberg, Richard K., 4,116,219, Cl. 126-271.000.

Robertson, Allan James: *See*—
Leman, Jeffrey Donald; and Robertson, Allan James, 4,117,200, Cl. 428-526.000.

Robertson, Vivian. Book holder. 4,116,414, Cl. 248-451.000.

Robinson, Graham: *See*—
Markin, Trevor Leslie; Bones, Roger John; Scott, Keith Taylor; May, Geoffrey John; and Robinson, Graham, 4,117,209, Cl. 429-104.000.

Robinson, Warn D.: *See*—
Mount, Ramon A.; Raffelson, Harold; and Robinson, Warn D., 4,116,868, Cl. 252-428.000.

Roche, Lawrence R., to Dyna Technology, Inc. Alternating current generator. 4,117,388, Cl. 322-25.000.

Rockwell International Corporation: *See*—
Newman, Francis L., 4,117,348, Cl. 307-232.000.
Sammells, Anthony F., 4,116,780, Cl. 204-2.100.
White, Frederic H., III, 4,117,319, Cl. 250-201.000.

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Sanvito, Roberto, 4,116,142, Cl. 112-121.260.

Rogers, Ryland F.: *See*—
Young, Eugene F.; Ray, Curtis M.; and Rogers, Ryland F., 4,116,555, Cl. 355-15.000.

Rogovin, A. Terry. Timing attachment for telephones. 4,115,997, Cl. 58-144.000.

Rohm and Haas Company: *See*—
Kunin, Robert, 4,116,860, Cl. 252-192.000.

Rohrer, Walter J., to John Rohrer Contracting Company. Method for screeding cement. 4,115,976, Cl. 52-741.000.

Rohringer, Peter; Lohmann, Frank; and Wurster, Rudolf F., to Ciba-Geigy Corporation. Agent for flame proofing synthetic fibrous material. 4,116,702, Cl. 106-15.0FP.

Rollei-Werke Franke & Heidecke: *See*—
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Rooney, Terence R., to Albright & Wilson Ltd. Aluminium polishing compositions. 4,116,699, Cl. 106-3.000.

Roop, Robert; and Shine, Carl, to Fischer & Porter Co. Corrosion-resistant liquified gas evaporator. 4,116,016, Cl. 62-52.000.

Roos, Eberhard, to DELMA, elektro und medizinische Apparatebaugesellschaft m.b.H. Electro - surgical device. 4,116,198, Cl. 128-303.150.

Roos, Ernst: *See*—
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Rose, Jonathan: *See*—
Hodgson, Duncan Barry; Thornton, John Robert; and Rose, Jonathan, 4,117,453, Cl. 340-76.000.

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Rosen, Harold A.: *See*—
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Rosen, Irving: *See*—
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Rosenberg, Peretz. Remotely actuated valves and fluid distribution system including same. 4,116,216, Cl. 137-624.130.

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Rosensweig, Ronald E., to Exxon Research & Engineering Co. Process for operating a magnetically stabilized fluidized bed. 4,115,927, Cl. 34-1.000.

Rosinski, Edward J.: *See*—
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Rosplock, Sara E.: *See*—
Boyd, David C.; Flannery, James E.; Morgan, David W.; Rosplock, Sara E.; and Sczerbaniewicz, Stella A., 4,116,704, Cl. 106-54.000.

Ross, Curtis R.; Ross, Frank R.; Ross, Eugene G.; and Winborn, Gloria R. Vehicle seat lock. 4,116,297, Cl. 180-114.000.

Ross, Eugene G.: *See*—
Ross, Curtis R.; Ross, Frank R.; Ross, Eugene G.; and Winborn, Gloria R., 4,116,297, Cl. 180-114.000.

Ross, Frank R.: *See*—
Ross, Curtis R.; Ross, Frank R.; Ross, Eugene G.; and Winborn, Gloria R., 4,116,297, Cl. 180-114.000.

Ross, Sidney D.; Dunkl, Franz S.; and Finkelstein, Manuel, to Sprague Electric Company. Electrolytic capacitor. 4,117,531, Cl. 361-433.000.

Rossetti, Vittorio; Marsili, Leonardo; and Pasqualucci, Carmine, to Archifar Industrie Chimiche del Trentino S.p.A. Rifamycin compounds. 4,116,957, Cl. 260-239.30P.

Rossmann, Axel: *See*—
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Rowe, Jerry, to FMC Corporation. Method of sealing tapholes in a phosphorus furnace. 4,116,421, Cl. 266-45.000.

RTE Corporation: *See*—
Spicer, Bruce G., 4,116,515, Cl. 339-12.00R.

Rubel, Jean-Paul: *See*—
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Rubin, Barry Jay: *See*—
Anantha, Narasipur Gundappa; Cases, Moises; Chang, Fung Yuel; and Rubin, Barry Jay, 4,117,546, Cl. 365-233.000.

Rubin, Mae K.; Rosinski, Edward J.; and Plank, Charles J., to Mobil Oil Corporation. Hydrocarbon conversion with crystalline zeolite ZSM-34. 4,116,813, Cl. 208-46.000.

Rubin, Wolfgang: *See*—
Aucktor, Erich; and Rubin, Wolfgang, 4,116,020, Cl. 64-21.000.

Ruck, J. Barry, to Theochem Laboratories, Inc. Drain opener. 4,116,850, Cl. 252-103.000.

Rudd, Michael Jefferson, to Bolt Beranek and Newman Inc. Frequency measuring system employing an auto-correlation function frequency control loop. 4,117,419, Cl. 331-1.00A.

Rudolph, Frank W.: *See*—
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Rudolphy, Albert, to Hoechst Aktiengesellschaft. Printing ink binders. 4,116,910, Cl. 260-25.000.

Ruediger, Frederick, to Standard Pressed Steel Co. Tool for assembling storage system. 4,116,034, Cl. 72-387.000.

Ruegg, Edwin, to Netstal-Maschinen AG. Device for anchoring an injection molding machine tool part to a tool carrier. 4,116,599, Cl. 425-192.00R.

Ruegger, Artur: *See*—
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Ruehenbeck, Wolfgang: *See*—
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Ruehl, William Edwin: *See*—
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Runnion, Glenmore J.: *See*—
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Runte, Robert Ralph; and Mau, Theodore A., to Runte, Robert Ralph. Moving goalie circuit for a manually controlled electronic video game. 4,116,441, Cl. 273-85.00G.

Rupe, Lewis Allen; Tuthill, Lyle Brown; and Leikhim, John William, to Procter & Gamble Company, The. Thickened bleach compositions for treating hard-to-remove soils. 4,116,851, Cl. 252-103.000.

Russak, Michael A.: *See*—
Deb, Satyendra K.; Chen, Schoen-nan; Witzke, Horst; Russak, Michael A.; and Reichman, Joseph, 4,117,210, Cl. 429-111.000.

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Ruti Machinery Works Ltd.: *See*—
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Abramov, Ivan Egorovich; Gershanov, Felix Borisovich; Dolidze, Vladimir Romanovich; Zakharova, Nina Vasilievna; Liakumovich, Alexandr Grigorievich; Michurov, Jury Ivanovich; Popov, Vasily Dmitrievich; Rutman, Grigory Iosifovich; and Shalimova, Zoya Stepanovna, 4,117,244, Cl. 568-799.000.

Ryan, James P.: *See*—
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Ryer, Jack; Brois, Stanley J.; and Winans, Esther D., to Exxon Research & Engineering Co. Amine salts of carboxylate half esters of 1-aza-3,7-dioxabicyclo [3.3.0] oct-5-yl methyl alcohols, their preparation and use as additives for gasoline and middle distillate fuels. 4,116,643, Cl. 44-63.000.

Ryer, Jack: *See*—
Outten, Edward Francis; Ryer, Jack; and Williams, John E., 4,116,877, Cl. 252-72.000.

Ryobi, Ltd.: *See*—
Honkawa, Yoshinori, 4,117,316, Cl. 235-92.0SB.

S. E. Huffman Corporation: *See*—
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Sabourin, Edward T.: *See*—
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Sackl, Alois: *See*—
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Safford, George J.: *See*—
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Sagara, Takao: *See*—
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Saika, Keiji: *See*—
Sando, Yoshikazu; Ishidoshiro, Hiroshi; Tsuchihashi, Takashi; and Saika, Keiji, 4,116,023, Cl. 68-13.00R.

Saint-Gobain Industries: *See*—
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Saito, Haruhiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas recirculation apparatus. 4,116,178, Cl. 123-119.00A.

Saito, Mamoru: *See*—
Sugahara, Yujiro; Noshi, Yoshibumi; Naito, Hiroyuki; Saito, Mamoru; Takahashi, Akira; and Tuchida, Hisashi, 4,117,104, Cl. 423-619.000.

Sakai Chemical Industry Co., Ltd.: *See*—
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Sakaida, Atsuo: *See—*
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Sakura, Gerald Paul. Device for measuring quantity of flowable materials. 4,116,071, Cl. 73-429.000.
Salmond, William G., to Upjohn Company, The. Novel method for preparing cholesta-5,7-diene 3β,25-diol and derivatives thereof. 4,116,985, Cl. 260-397.200.
Salo, Esko, to Oy Wiik & Hoglund Ab. Method of compensating for the roll deflection in a calender. 4,117,054, Cl. 264-40.100.
Salyers, John C.: *See—*
Liberman, Harvey W.; Goranson, Paul L.; Ratledge, R. Houston, Jr.; and Salyers, John C., 4,116,121, Cl. 100-39.000.
Samaginov, Veniamin Mikhailovich: *See—*
Maslov, Vadim Nikolaevich; Korobov, Oleg Evgenievich; Lupacheva, Alla Naumovna; Vlasov, Alexandr Nikolaevich; Myasoedov, Viktor Vasilievich; Bochkarev, Ellin Petrovich; Gimelfarb, Felix Aronovich; Bronshtein, Izidor Karlovich; Lukicheva, Natalya Ivanovna; Sinitsyn, Evgeny Vladimirovich; Sokurenko, Jury Varnavovich; Jurova, Elena Sergeevna; Kistova, Elena Mikhailovna; Konstantinova, Marina Andreevna; and Samaginov, Veniamin Mikhailovich, 4,117,504, Cl. 357-16.000.
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Yamabe, Masaaki; Arai, Kiyotaka; Samejima, Shunichi; and Noshiro, Makoto, 4,116,977, Cl. 260-343.600.
Sammells, Anthony F., to Rockwell International Corporation. Method of making a lithium-silicon boron electrode for electrical energy storage device. 4,116,780, Cl. 204-2.100.
Sand, Roger D., to General Motors Corporation. Internal combustion engine ignition spark timing system modulated by cylinder combustion pressure. 4,116,175, Cl. 123-117.00R.
Sanders Associates, Inc.: *See—*
Baer, Ralph H.; and Cope, Leonard D., 4,117,511, Cl. 358-83.000.
Sandfort, Robert M.: *See—*
Minnick, Robert C.; Bailey, Paul T.; Sandfort, Robert M.; and Semon, Warren L., 4,117,543, Cl. 365-5.000.
Sando Iron Works Co., Ltd.: *See—*
Sando, Yoshikazu; Ishidoshiro, Hiroshi; Tsuchihashi, Takashi; and Saika, Keiji, 4,116,023, Cl. 68-13.00R.
Sando, Yoshikazu; and Ishidoshiro, Hiroshi, 4,116,627, Cl. 8-149.300.
Sando, Yoshikazu; Ishidoshiro, Hiroshi; Tsuchihashi, Takashi; and Saika, Keiji, to Sando Iron Works Co., Ltd. Continuous water washing apparatus for cloth. 4,116,023, Cl. 68-13.00R.
Sando, Yoshikazu; and Ishidoshiro, Hiroshi, to Sando Iron Works Co., Ltd. Method for sealing a high pressure steamer and an apparatus for carrying out the same. 4,116,627, Cl. 8-149.300.
Sandoz, Inc.: *See—*
Hardtmann, Goetz E., 4,117,137, Cl. 424-263.000.
Sandoz Ltd.: *See—*
Harri, Eugen; and Ruegger, Artur, 4,117,118, Cl. 424-177.000.
Sandvik Aktiebolag: *See—*
Witberg, Martinus Johannes Joseph, 4,116,100, Cl. 83-698.000.
Sankyo Company Limited: *See—*
Minato, Sadamasa; Hattori, Atsushi; Baba, Yoshihiko; Yabe, Yuichiro; and Ueda, Seigo, 4,116,774, Cl. 195-99.000.
Sano, Hiroshi, to Agency of Industrial Science & Technology. Method of combustion for depressing nitrogen oxide discharge. 4,117,075, Cl. 423-235.000.
Sano, Shunichi, to Tokyo Shibaura Electric Co., Ltd. Method of coating substrate for liquid crystal display device. 4,116,658, Cl. 65-42.000.
San Pietro, Craig, to Okidata Corporation. Printer synchronization control for shuttle having non-uniform velocity. 4,116,567, Cl. 400-124.000.
Sanson, Joseph; and Moser, Kurt, to Upjohn Company, The. Method of making a foam plastic cushion having a peripheral frame and an exterior cover. 4,116,736, Cl. 156-79.000.
Sansui Electric Co., Ltd.: *See—*
Takahashi, Susumu; and Iida, Hiroshi, 4,117,406, Cl. 325-348.000.
Sanvito, Roberto, to Rockwell-Rimoldi S.p.A. Workpiece tensioning device for a sewing unit. 4,116,142, Cl. 112-121.260.
Sanyo Chemical Industries, Ltd.: *See—*
Sato, Teruyuki; and Kawakatsu, Kunio, 4,116,846, Cl. 252-78.100.
Sarges, Reinhard, to Pfizer Inc. Hydantoin derivatives as therapeutic agents. 4,117,230, Cl. 548-309.000.
Sasaki, Tadao: *See—*
Hosaka, Takuo; Sasaki, Tadao; and Suzuki, Hiroshige, 4,117,096, Cl. 423-345.000.
Sato, Atsushi; and Kawaguchi, Hikotarou, to Kao Soap Co., Ltd. Tube caser. 4,115,982, Cl. 53-534.000.
Sato, Ichiro: *See—*
Kawaike, Kazuo; Uchiya, Tsuneo; and Sato, Ichiro, 4,117,255, Cl. 174-31.00R.
Sato, Kazuo; Toriyama, Haruhiko; and Matsushige, Seiichi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Apparatus for detecting variation of a condition amount in a mechanical device. 4,117,451, Cl. 340-52.00A.
Sato, Masaharu: *See—*
Tsunoo, Masahiko; Hirose, Namio; Kimura, Takeji; Inoue, Michihiro; and Sato, Masaharu, 4,116,102, Cl. 84-1.220.
Sato, Masanari: *See—*
Isowa, Yoshikazu; Ohmori, Muneki; Kurita, Hideaki; Ichikawa, Tetsuya; Sato, Masanari; Mori, Kaoru; and Oyama, Kiyotaka, 4,116,768, Cl. 195-29.000.
Sato, Shozo: *See—*
Tojyo, Tsutomu; and Sato, Shozo, 4,116,753, Cl. 156-629.000.
Sato, Suguru: *See—*
Iwata, Yoriaki; and Sato, Suguru, 4,117,390, Cl. 322-90.000.
Sato, Teruyuki; and Kawakatsu, Kunio, to Sanyo Chemical Industries, Ltd. Hydraulic fluid compositions comprising borate esters. 4,116,846, Cl. 252-78.100.
Sattaripour, Ali. Earthquake recording device. 4,117,496, Cl. 346-7.000.
Satterwhite, Charles R., to Unit Rig and Equipment Co. Excavating and pipeline installation system. 4,116,014, Cl. 405-179.000.
Sauer, Clement J., to Chem-Farm Inc. Cold flow liquid vapor shoe. 4,116,139, Cl. 111-7.000.
Saugatuck Industries, Incorporated: *See—*
Belmuth, Harold M.; Leto, Alfred R.; London, Lawrence; and Zuckerman, Herman A., 4,115,938, Cl. 40-152.000.
Saunders, Arthur G.: *See—*
Lewis, Barry J.; Kuspert, John C.; Saunders, Arthur G.; and McAusland, Robert R., 4,116,750, Cl. 156-563.000.
Saunderson, Allan: *See—*
Gates, Allen Peter; and Saunderson, Allan, 4,117,039, Cl. 260-875.000.
Savage, David: *See—*
Bradshaw, Noel James; Savage, David; and Sneath, Michael Edwin, 4,117,172, Cl. 426-276.000.
Savage Technical Services, Inc.: *See—*
Bertelson, Alexander Bruno, 4,116,835, Cl. 210-100.000.
Sawafuji Electric Co. Ltd.: *See—*
Hazumi, Kenji; and Tagami, Katsutoshi, 4,117,389, Cl. 322-47.000.
Sawata, Shinji; Tani, Tatsuo; Tanaka, Tadayoshi; and Horigome, Takashi, to Agency of Industrial Science & Technology. Apparatus for heat transfer. 4,116,266, Cl. 165-105.000.
Sawyer, Edgar W., Jr., to International Telephone and Telegraph Corp. Water purification methods. 4,116,825, Cl. 210-27.000.
Sawyer, Edgar W., Jr., to International Telephone and Telegraph Corp. Water purification methods. 4,116,826, Cl. 210-27.000.
Sawyer, Edgar W., Jr., to International Telephone and Telegraph Corp. Water purification methods. 4,116,827, Cl. 210-27.000.
Sawyer, Edgar W., Jr., to International Telephone and Telegraph Corp. Water purification methods. 4,116,828, Cl. 210-27.000.
Saxon, Daniel Isaiah; and Leonard, Vernon Leon, to Eastman Kodak Company. Apparatus for stuffer box crimping. 4,115,908, Cl. 28-269.000.
Saxon, John William Charles: *See—*
Sheffield, David John; and Saxon, John William Charles, 4,116,036, Cl. 72-391.000.
Scaduto, Francis J., to Raymond Lee Organization, Inc., The, a part interest. Portable massager. 4,116,233, Cl. 128-32.000.
Scamehorn, John F.: *See—*
Bendig, Larry L.; and Scamehorn, John F., 4,117,106, Cl. 423-630.000.
Yang, Kang; and Scamehorn, John F., 4,117,085, Cl. 423-264.000.
Schade, Otto Heinrich, Jr., to RCA Corporation. Current mirror amplifiers with programmable current gains. 4,117,416, Cl. 330-282.000.
Schaefer, Hans-Georg; and Vogts, Axel. Method of separating active hydrogen compounds from heterogeneous mixtures also containing compounds which do not contain active hydrogens. 4,116,811, Cl. 208-44.000.
Schafersman, Roy Leonard: *See—*
Ehrlich, Marilyn Carol; and Schafersman, Roy Leonard, 4,117,278, Cl. 179-175.20C.
Schanz, Johannes, to ITT Industries, Inc. Sleeve seal for master cylinders of hydraulic brake systems. 4,116,452, Cl. 277-205.000.
Scheinecker, Alois: *See—*
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Schering, A.G.: *See—*
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Scheurecker, Werner: *See—*
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Schiesser AG: *See—*
Schiesser, Walter Hugo, 4,116,096, Cl. 83-101.000.
Schiesser, Walter Hugo, to Schiesser AG. Strip cutter apparatus for rolled sheet formed of rubber. 4,116,096, Cl. 83-101.000.
Schiffer, Gunter: *See—*
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Schimpf, James E.; Boggs, Roger L.; and Kinsinger, Malcolm H., to Caterpillar Tractor Co. Apparatus for reducing track noise in a track-type vehicle. 4,116,497, Cl. 305-41.000.
Schisselbauer, John C.; and Dobson, John J., to Peripheral Dynamics, Inc. Card reader with means for unloading output hopper on the fly. 4,117,314, Cl. 235-475.000.
Schiweck, Hubert; Steinle, Georg; Muller, Lutz; Gau, Wolfgang; and Munir, Mohammad, to Suddeutsche Zucker-Aktiengesellschaft. Use

of glucopyranosido-1,6-mannitol as a sugar substitute. 4,117,173, Cl. 426-548.000.
Schlafer, John D., to GTE Laboratories Incorporated. Laser lithography of thin film resinates. 4,117,177, Cl. 427-53.000.
Schlichting, Kenneth J. Spark timing computer. 4,116,174, Cl. 123-117.00R.
Schlig, Eugene Stewart; and Stilwell, George Raymond, Jr., to International Business Machines Corporation. Light pen detection and tracking with AC plasma display panel. 4,117,471, Cl. 340-324.00M.
Schlumberger Technology Corporation: *See*—
Souhaite, Philippe, 4,117,394, Cl. 324-10.000.
Schmelzbasaltwerk Kalenborn, Dr. Ing. Mauritz KG: *See*—
Brassel, Leo, 4,116,621, Cl. 432-233.000.
Schmid, Karlheinz, to Gebrueder Heller Maschinenfabrik GmbH. Milling apparatus. 4,116,111, Cl. 90-15.00R.
Schmid Laboratories, Inc.: *See*—
Gordon, Harry W., 4,117,114, Cl. 424-115.000.
Schmidt, Bradley J., to Illinois Tool Works Inc. Laundry appliance door hinge. 4,115,901, Cl. 16-176.000.
Schmidt, John P., to Halcon International, Inc. Two stage maleic anhydride process. 4,116,983, Cl. 260-346.750.
Schmitt, Frederick Louis: *See*—
Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick Louis; and Vock, Manfred Hugo, 4,117,015, Cl. 260-586.00C.
Schmitt, Ludwig Peter. Sealed wall lead-through means for cables in particular for junction boxes. 4,116,472, Cl. 285-4.000.
Schmitt, Werner; Purrmann, Robert; and Jochum, Peter, to ESPE Fabrik Pharmazeutischer Praparate GmbH. Process for the photopolymerization of acrylic acid ester-containing compositions. 4,116,788, Cl. 204-159.230.
Schneider, Louis; and Graham, David E., to GAF Corporation. Selective chlorination of benzoyl chloride. 4,117,006, Cl. 260-544.00D.
Schneider, Louis; and Graham, David E., to GAF Corporation. Method of making N-[4-chlorophenyl)amino]carbonyl)-2,6-difluorobenzamide. 4,117,009, Cl. 260-553.00E.
Schneider, Louis; and Graham, David E., to GAF Corporation. Nematocide control diacylimide control diacylimide compositions. 4,117,162, Cl. 424-320.000.
Schneider, Louis; and Graham, David E., to GAF Corporation. Broad spectrum fungicidal diacylimide compositions. 4,117,163, Cl. 424-320.000.
Schnizler, Albrecht, Jr.; and Bartmann, Klaus, to Metabowerke KG Closs Rauch & Schnizler. Chuck for hammerdrills and the like. 4,116,454, Cl. 279-62.000.
Schob, Otmar: *See*—
de Bie, Jan Rudolf; Ekkelboom, Tjepke Hendrik; Geytenbeek, Johannes Jacobus Franciscus; van Hoorn, Willem Lodewijk; and Schob, Otmar, 4,117,367, Cl. 313-352.000.
Schoemer, Hans Louis, to Motorola, Inc. Modular pushbutton keyset assembly. 4,117,279, Cl. 200-5.00A.
Schoenholz, Daniel; Petersen, Arthur Walter; and Northup, Marcus Allen, Jr., to Church & Dwight Co., Inc. Novel cleaning method and compositions. 4,116,848, Cl. 252-90.000.
Schofield, Charles R.: *See*—
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Schofield, David: *See*—
Makinson, George Kenneth; and Schofield, David, 4,116,998, Cl. 260-465.00D.
Schoknecht, Gunter; and Flesch, Udo. Tissue simulating calibration and reference standard. 4,116,040, Cl. 73-1.00R.
Schroder, Eberhard; and Koch, Henning, to Schering, A.G. Novel 5,6,7,8-tetrahydro-5-quinolines and their use as anti-inflammatory agents. 4,117,135, Cl. 424-258.000.
Schubert, Bernhard, to Hauni-Werke Korber & Co. KG. Apparatus for separating lowermost sheets from a stack. 4,116,428, Cl. 271-14.000.
Schue, Francois: *See*—
Lehn, Jean-Marie; Schue, Francois; Boileau, Sylvia; Kaempf, Bernd; Cau, Alain Andre; Moinard, Jean Robert; and Raynal, Serge Fernand, 4,116,887, Cl. 260-2.00A.
Schulmeister, Robert; and Roth, Helmut, to Motoren-und Turbinen-Union Friedrichshafen GmbH. Cooling device for an internal combustion engine. 4,116,171, Cl. 123-41.570.
Schulten, Rudolf; and Behr, Friedrich, to Rheinische Braunkohlenwerke AG. Thermochemical process for producing methane and oxygen from carbon oxides and water. 4,117,102, Cl. 423-579.000.
Schultz, Sidney Joseph: *See*—
Olivo, Anthony Robert; Soldatos, Anthony Constantine; and Schultz, Sidney Joseph, 4,116,921, Cl. 260-38.000.
Schulze, Heinz; and Waddill, Harold G., to Texaco Development Corp. Polyether diureide epoxy additives. 4,116,938, Cl. 528-93.000.
Schurrer, Josef: *See*—
Motz, Karl; Meyer, Josef; and Schurrer, Josef, 4,116,501, Cl. 308-9.000.
Schuster, Heinz; and Prange, Rolf, to Varta Batterie Aktiengesellschaft. Electric storage battery, particularly for vehicles. 4,117,211, Cl. 429-121.000.
Schuster, Hubert: *See*—
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Schwabacher, William Peter, to Hoffmann-La Roche Inc. Self-centering rotatable closure retainer. 4,116,353, Cl. 215-274.000.
Schwarz, Eckhard C. A., to Biax-Fiberfilm Corporation. Process for stretching incremental portions of an orientable thermoplastic substrate and product thereof. 4,116,892, Cl. 521-62.000.
Schwender, Charles F.; and Sunday, Brooks R., to Warner-Lambert Company. 1,2-Benzoxathiin-2,2,-dioxides. 4,116,961, Cl. 260-293.570.
Schwender, Charles F.; and Pike, Russell E., to Warner-Lambert Company. Method of inhibiting gastric acid secretions with 2-(4-pyrimidinyl)thioacetamides. 4,117,131, Cl. 424-251.000.
Schwerdt, Friedrich Wilhelm: *See*—
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Scoggins, Lacey E.: *See*—
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Scott & Fetzer Company, The: *See*—
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Scott, Gary, to Bombardier Limited. Internal snow deflector for snowmobile track. 4,116,496, Cl. 305-12.000.
Scott, Jack C. Tennis ball retriever. 4,116,192, Cl. 124-51.00R.
Scott, Keith Taylor: *See*—
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Sears, Ernest L. Message display arrangement for bicycle or like vehicle. 4,115,942, Cl. 40-547.000.
Seebach, Adolf, to Dr. Adolf Seebach AG. Process for the production of stabilized pure theophylline in neutral, aqueous solution. 4,117,132, Cl. 424-253.000.
Seebinger, Frederick L., to American Trading and Production Corp. Horn loudspeaker. 4,116,302, Cl. 181-192.000.
Segura, Claude Gines Fernand. Dental mold. 4,116,416, Cl. 249-54.000.
Seidel, Sigurd, to Skischuhfabrik Dynafit Gesellschaft m.b.H. Fastener for shoes. 4,115,905, Cl. 24-69.0SK.
Seifried, Walter, to Hoechst Aktiengesellschaft. Process and apparatus for collecting solar energy. 4,116,222, Cl. 126-271.000.
Seigneur, Alain: *See*—
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Seiko Seiki Kabushiki Kaisha: *See*—
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Seip, Walter V. Anti-skid attachment for vehicle tires. 4,116,254, Cl. 152-233.000.
Seki, Haruo: *See*—
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Sekisui Kagaku Kogyo Kabushiki Kaisha: *See*—
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Sekmakas, Kazys; and Shah, Raj, to DeSoto, Inc. Low temperature curing ester copolymers-phenolic condensates. 4,116,901, Cl. 260-19.0UA.
Sellstedt, John M.; and Klaubert, Dieter H., to American Home Products Corporation. Tetrazole-5-carboxamide derivatives. 4,116,960, Cl. 544-366.000.
Selvin, Gerald J.; and Moore, John R., to International Telephone and Telegraph Corporation. Flexible printed circuit and electrical connection therefor. 4,116,517, Cl. 339-17.00F.
Semco Instrument, Inc.: *See*—
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Semon, Warren L.: *See*—
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Senior, Franklin C., to Feed Recycling Co. Process for recovering nutrients from cattle manure. 4,117,175, Cl. 426-657.000.
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Moller, Eike; Meng, Karl-August, deceased; Wehinger, Egbert; Horstmann, Harald; and Seuter, Friedel, 4,117,145, Cl. 424-273.00P.
Sever, Janez F., to Square D Company. Electromagnetically operated friction brake. 4,116,308, Cl. 188-171.000.
SGS-ATES Componeti Elettronici S.p.A.: *See*—
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Shabi, Fuad Aboodi; and Hibberd, Richard Loxley, to Air Products and Chemicals, Inc. Method of fish farming. 4,116,164, Cl. 119-3.000.
Shafer, John I.; and Marsh, Harold E., Jr., to United States of America, National Aeronautics and Space Administration. Solid propellant motor. 4,116,131, Cl. 102-103.000.

Shah, Jagdish Chandullal, to International Telephone & Telegraph Corp. Pouch sealing device. 4,117,306, Cl. 219-243.000.
Shah, Nayan S., to Kendall Company, The. Catheter with inflation control device. 4,116,201, Cl. 128-351.000.
Shah, Pravinchandra B.: *See—*
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Shanker, Benjamin. Modular electric light switch assembly. 4,117,258, Cl. 174-53.000.
Shapiro, L. Dennis: *See—*
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Shapiro, Warren B.; and Blackburne, Owen Rodney, to Noxell Corporation. Method and composition for improving oral hygiene. 4,117,107, Cl. 424-54.000.
Shapiro, Warren B.; and Blackburne, Owen Rodney, to Noxell Corporation. Oral hygiene. 4,117,108, Cl. 424-54.000.
Sharp, Chester E., to United States of America, Army. Buoyant chaff. 4,117,486, Cl. 343-18.00E.
Sharp Kabushiki Kaisha: *See—*
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von Strandtmann, Max; Cohen, Marvin P.; Klutchko, Sylvester; and Shavel, John, Jr., 4,116,971, Cl. 260-308.00D.
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Sheffield, David John; and Saxon, John William Charles, to Aerpat A.G. Hydraulically operated riveting apparatus. 4,116,036, Cl. 72-391.000.
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Feenstra, Robijn, 4,116,289, Cl. 175-329.000.
Himes, Glenn R., 4,117,037, Cl. 260-880.00B.
Shephard, Margaret Claire; and Fox, Roland Thomas Victor, to Imperial Chemical Industries Limited. Fungicidal compositions and processes. 4,117,147, Cl. 424-274.000.
Shepherd, Robert Gordon, to American Cyanamid Company. 4-(Monoalkylamino)benzonitriles useful as anti-atherosclerotic agents. 4,117,158, Cl. 424-304.000.
Sherrington, Paul Richard: *See—*
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Shibata, Toshihiro: *See—*
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Shibata, Tsuneo; Maki, Masao; Suzuki, Masao; and Kawabe, Hidehiko, to Matsushita Electric Industrial Co., Ltd. Gas-purifying composition and method of producing it. 4,116,881, Cl. 252-440.000.
Shields, Mary J. Combined shoulder strap bag and cushion. 4,116,310, Cl. 190-42.000.
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Shier, John S. Method of manufacturing a buried load device in an integrated circuit. 4,116,732, Cl. 148-175.000.
Shima, Takashi: *See—*
Tanahashi, Sakae; and Shima, Takashi, 4,116,050, Cl. 73-88.50R.
Shimago, Kozo: *See—*
Yamada, Hirotada; Okamura, Kosaku; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,117,126, Cl. 424-246.000.
Shimano Industrial Company Limited: *See—*
Nagano, Masashi; and Watarai, Etsuyoshi, 4,116,319, Cl. 192-64.000.
Shimizu, Harry H., to Cominco Ltd. Heat treatment of cadmium mercury telluride and product. 4,116,725, Cl. 148-20.300.
Shimizu, Hirofumi; Yoshinaka, Akira; and Sugita, Yoshimitsu, to Hitachi, Ltd. Method of making semiconductor device with PN junction in stacking-fault free zone. 4,116,719, Cl. 148-1.500.
Shin-Kobe Electric Machinery Co., Ltd.: *See—*
Kitai, Yasuo, 4,117,205, Cl. 429-86.000.
Shindelar, Joseph John: *See—*
Barnes, Theodore Marion; Shindelar, Joseph John; Bass, Merlyn Duane; and Suechting, Henry William, Jr., 4,115,983, Cl. 56-98.000.
Shine, Carl: *See—*
Roop, Robert; and Shine, Carl, 4,116,016, Cl. 62-52.000.
Shintani, Takamasa; and Nagasawa, Koyo, to Fuji Xerox Co., Ltd. Data compression system for binary facsimile signals. 4,117,517, Cl. 358-260.000.
Shiohara, Tomoo; Matsunaga, Takayoshi; and Horioka, Mikihiko, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Chlorine-containing resin compositions. 4,116,907, Cl. 260-23.0XA.
Shionogi & Co., Ltd.: *See—*
Yukinaga, Hisajiro; Sumimoto, Shinzaburo; Ishizuka, Ichiro; and Sugita, Jitsuo, 4,116,671, Cl. 71-88.000.
Shioyama, Tadao; and Koda, Minoru, to Matsushita Electric Industrial Co., Ltd. Guide drum apparatus in a magnetic recording and/or reproducing apparatus. 4,117,519, Cl. 360-84.000.
Shipowners Refrigerated Cargo Research Association: *See—*
Pearson, Kenneth White; and Richards, David William Thomas, 4,116,418, Cl. 251-149.200.
Shirokova, Larisa Borisovna: *See—*
Korshak, Vasily Vladimirovich; Vinogradova, Svetlana Vasilievna; Storozhuk, Ivan Pavlovich; Valetsky, Petr Maximilianovich; Sokolov, Lev Borisovich; Mikitaev, Abdulakh Kazbulatovich; Askadsky, Andrei Alexandrovich; Kochergin, Jury Sergeevich; Slonimsky, Grigory Lvovich; Shirokova, Larisa Borisovna; Nebosenko, Ljudmila Fedorovna; and Zhuravlev, Nikolai Danilovich, 4,116,940, Cl. 528-173.000.
Shiroshima, Makoto: *See—*
Tonouchi, Takeo; Tonouchi, Akio; Shiroshima, Makoto; Chimura, Yuichi; and Ohkubo, Kazuyoshi, 4,117,174, Cl. 426-634.000.
Shishulin, Jury Pavlovich: *See—*
Gelfand, Mikhail Lvovich; Goldshtein, Boris Grigorievich; Gornik, Leonid Avrumovich; Shishulin, Jury Pavlovich; Tsipenjuk, Yakov Isaakovich; and Tsygankov, Oleg Semenovich, 4,116,578, Cl. 408-222.000.
Shizu, Kazunori, to Denki Onkyo Co., Ltd. Deflection yoke with unitary coil frame. 4,117,432, Cl. 335-210.000.
Shizume, Peter K., to Sperry Rand Corporation. Angular deception countermeasure system. 4,117,484, Cl. 343-18.00E.
Shkatov, Evgeny Petrovich: *See—*
Lezgintsev, Georgy Mikhailovich; Istoshin, Stanislav Jurievich; Belyavsky, Mikhail Anatolievich; Kontar, Evgeny Alexeevich; Koptyazhin, Nikolai Nikolaevich; Agaltsov, Georgy Ivanovich; Chernov, Boris Serafimovich; Ter-Saakov, Eduard Isaakovich; and Shkatov, Evgeny Petrovich, 4,116,069, Cl. 73-425.200.
Sholle, Roger W., to TRW Inc. Ferrule for stud welding. 4,117,297, Cl. 219-98.000.
Shosuke Okamoto: *See—*
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,117,127, Cl. 424-247.000.
Shrader, William W.; and Campbell, Ronald B., Jr., to Raytheon Company. Radar system with specialized weighting. 4,117,538, Cl. 364-517.000.
Sibley, Bruce D.: *See—*
Swander, Kenneth D., Jr.; and Sibley, Bruce D., 4,116,114, Cl. 92-130.00A.
Sick, Erwin, to Erwin Sick Gesellschaft mit beschrankter Haftung Optik-Elektronik. Device for concentrating light from a linear field on to a receiver. 4,116,527, Cl. 350-6.700.
Sick, Erwin, to Erwin Sick Gesellschaft mit beschrankter Haftung Optik-Elektronik. Line scanning device for detecting defects in webs of material. 4,116,566, Cl. 356-200.000.
Siden, LeRoy E.: *See—*
Slysh, Paul; and Siden, LeRoy E., 4,116,258, Cl. 160-213.000.
Siemens Aktiengesellschaft: *See—*
Franke, Kurt, 4,117,335, Cl. 250-402.000.
Giebel, Wolfgang; Krause, Herbert; and Meltsch, Hans-Juergen, 4,117,259, Cl. 174-92.000.
Streich, Georg; and Bauer, Johann, 4,117,428, Cl. 335-132.000.
Streich, Georg; and Bauer, Johann, 4,117,429, Cl. 335-132.000.
Susdorf, Roman; and Engelmann, Heinz, 4,116,091, Cl. 74-801.000.
Siems, Lee E., to Western Geophysical Company of America. Seismic telemetric system for land operations. 4,117,448, Cl. 340-15.5TS.
Siemsen, Cathy S.: *See—*
Bendig, Larry L.; Siemsen, Cathy S.; and Stowell, Donald E., 4,116,882, Cl. 252-448.000.
Sievers, George K. Pool float propelling apparatus. 4,115,888, Cl. 9-347.000.
SIG Schweizerische Industrie-Gesellschaft: *See—*
Hampejs, Karel, 4,116,112, Cl. 91-380.000.

Silver, Hayden J., Jr.; and Stackhouse, James H., Jr., to Texaco Inc. Floating tank roof improvement. 4,116,356, Cl. 220-85.00R.

Simon, James Louis: *See—*
Cannon, Thomas Burt; Metz, Robert Forcier; and Simon, James Louis, 4,117,274, Cl. 179-99.000.

Simonet, Jean-Claude: *See—*
Krafft, Camille Gabriel; Simonet, Jean-Claude; and Jammes, Emmanuel Marie, 4,117,427, Cl. 335-112.000.

Simpson, Talmadge Whipple. Arrangement for interconnecting a side delivery rake and a baler. 4,115,984, Cl. 56-13.500.

Sims, Dewey M., Jr., to Burroughs Corporation. Keyboard switch. 4,117,430, Cl. 335-205.000.

Sims, Joseph Alton, Jr.: *See—*
Foster, Robert Dean; Maliszewski, Thomas Arthur; Sims, Joseph Alton, Jr.; and Taylor, Glenn Alfred, 4,117,250, Cl. 568-858.000.

Sims, William B., Jr.: *See—*
Hudspeth, Emmett L.; Richardson, Philip C.; Neathery, John L., Jr.; Dykstra, Jerald P.; Boger, Allen D., Jr.; Sims, William B., Jr.; Hunt, Glenn E.; and Quisenberry, Tony M., 4,116,228, Cl. 128-2.00R.

Sines, Randy D.; and Curran, John F., to Sines, Randy D. Automatic cue ball separating device for billiard tables. 4,116,435, Cl. 209-570.000.

Sinitsyn, Evgeny Vladimirovich: *See—*
Maslov, Vadim Nikolaevich; Korobov, Oleg Evgenievich; Lupacheva, Alla Naumovna; Vlasov, Alexandr Nikolaevich; Myasoedov, Viktor Vasilievich; Bochkarev, Ellin Petrovich; Gimelfarb, Felix Aronovich; Bronshtein, Izidor Karlovich; Lukicheva, Natalya Ivanovna; Sinitsyn, Evgeny Vladimirovich; Sokurenko, Jury Varnavovich; Jurova, Elena Sergeevna; Kistova, Elena Mikhailovna; Konstantinova, Marina Andreevna; and Samaginov, Veniamin Mikhailovich, 4,117,504, Cl. 357-16.000.

Sinton, Bernard: *See—*
Cummins, Peter Gerald; Sinton, Bernard; and Miller, Michael George, 4,117,185, Cl. 428-241.000.

Sjogren, Axel O., to Gates Rubber Company, The. Rechargeable battery enclosure. 4,117,203, Cl. 429-7.000.

Skala, Stephen F. Ink drop facsimile system. 4,117,518, Cl. 358-296.000.

Skega AB: *See—*
Svensson, Assar, 4,116,485, Cl. 296-39.00R.

SKF Kugellagerfabriken GmbH: *See—*
Huber, Wolfgang, 4,116,500, Cl. 308-9.000.

Skil Corporation: *See—*
Porth, Chris H.; and Lilja, E. Harold, 4,115,957, Cl. 51-170.0EB.

Skinner, Warren. Lid lifting tool for shipping containers. 4,116,362, Cl. 220-284.000.

Skischuhfabrik Dynafit Gesellschaft m.b.H.: *See—*
Seidel, Sigurd, 4,115,905, Cl. 24-69.0SK.

Skov, Valdemar: *See—*
Galvin, Aaron A.; Shapiro, L. Dennis; and Skov, Valdemar, 4,117,479, Cl. 340-502.000.

Skrobisch, Alfred, to Staver Company, Incorporated, The. Variable character display device. 4,117,478, Cl. 340-378.00R.

Slevinsky, Bruce Alexander: *See—*
Butler, Roger Moore; Bombardieri, Caurino Cesar; and Slevinsky, Bruce Alexander, 4,116,275, Cl. 166-303.000.

Slifkin, Malcolm: *See—*
Dalbow, Milton H.; Acevedo, Hernan F.; and Slifkin, Malcolm, 4,116,776, Cl. 195-103.700.

Sloan, Albert H. Impeller type fluid pump. 4,116,582, Cl. 415-175.000.

Sloan, Kenneth B.: *See—*
Bodor, Nicolae S.; and Sloan, Kenneth B., 4,117,232, Cl. 548-365.000.

Slonimsky, Grigory Lvovich: *See—*
Korshak, Vasily Vladimirovich; Vinogradova, Svetlana Vasilievna; Storozhuk, Ivan Pavlovich; Valetsky, Petr Maximilianovich; Sokolov, Lev Borisovich; Mikitaev, Abdulakh Kazbulatovich; Askadsky, Andrei Alexandrovich; Kochergin, Jury Sergeevich; Slonimsky, Grigory Lvovich; Shirokova, Larisa Borisovna; Nebosenko, Ljudmila Fedorovna; and Zhuravlev, Nikolai Danilovich, 4,116,940, Cl. 528-173.000.

Slysh, Paul; and Siden, LeRoy E., to General Dynamics Corporation. Panel deployment and retraction system. 4,116,258, Cl. 160-213.000.

Small, Marvin: *See—*
Spitzer, Joseph George; Small, Marvin; Osipow, Lloyd I.; and Marra, Dorothea C., 4,116,370, Cl. 222-402.180.

Smiggen, Frank J.; Burry, Devitt S.; Kallaby, Joseph; and Goltz, Wayne H. Method for removing photopolymers from metal substrates. 4,116,715, Cl. 134-6.000.

Smith, Colen S., to United States of America, Interior. Clog-free inorganic grout emplacement gun. 4,116,368, Cl. 222-145.000.

Smith, David L.; and Scherr, Norman J., Jr., to Valeron Corporation, The. Electronic column gage. 4,115,923, Cl. 33-172.00E.

Smith, Frank, to Imperial Chemical Industries Limited. Electrolytic diaphragm cells. 4,116,802, Cl. 204-252.000.

Smith, Herman W., to Upjohn Company, The. 2,2-Difluoro-13,14-didehydro-11-deoxy-17-phenyl-18,19,20-trinor-$PGF_{2}\alpha$ compounds. 4,117,233, Cl. 560-55.000.

Smith, James D. B.; and Kauffman, Robert N., to Westinghouse Electric Corp. Solventless impregnating composition. 4,117,361, Cl. 310-208.000.

Smith, Joseph Leland, to RCA Corporation. Static convergence device including magnetic corrector apparatus. 4,117,433, Cl. 335-212.000.

Smith, Leslie Harold, to Imperial Chemical Industries Limited. Ethanolamine derivatives having β-adrenergic blocking activity. 4,117,157, Cl. 424-304.000.

Smith, Richard C., to R. C. Smith Company. Modular furniture unit for hospital pharmacies or the like. 4,116,509, Cl. 312-257.000.

Smith, Richard E.: *See—*
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,116,431, Cl. 271-236.000.

Smith, Robert E.; Chytil, Frank S.; Feldstein, George; and Swartz, Dorman J., to Aliied Chemical Corporation. Moving filament gripping mechanism. 4,116,394, Cl. 242-25.00R.

Smith, Ronald R.: *See—*
Dotson, Donald R.; and Smith, Ronald R., 4,116,455, Cl. 280-7.120.

Smith, Russell G., to Xomox Corporation. Method of and apparatus for pressure buffering all leak paths of a lined plug valve. 4,116,208, Cl. 137-1.000.

SmithKline Corporation: *See—*
Berges, David Alan, 4,117,123, Cl. 424-246.000.
Berges, David Alan, 4,117,124, Cl. 424-246.000.
Berges, David Alan, 4,117,125, Cl. 424-246.000.
Brenner, L. Martin, 4,117,128, Cl. 424-248.500.
Chakrin, Lawrence William; Snader, Kenneth Means; and Willis, Chester Rhodes, 4,117,226, Cl. 542-438.000.

Smolin, Edwin M.: *See—*
Brachman, Armand E.; Khattab, Ghazi; and Smolin, Edwin M., 4,116,925, Cl. 260-42.180.

Snader, Kenneth Means: *See—*
Chakrin, Lawrence William; Snader, Kenneth Means; and Willis, Chester Rhodes, 4,117,226, Cl. 542-438.000.

Sneath, Michael Edwin: *See—*
Bradshaw, Noel James; Savage, David; and Sneath, Michael Edwin, 4,117,172, Cl. 426-276.000.

Snijders, Wilfred Andre Maria: *See—*
van den Elzen, Hendricus Christianus; van Gerwen, Petrus Josephus; and Snijders, Wilfred Andre Maria, 4,117,277, Cl. 179-170.600.

Snowling, Geoffrey David: *See—*
Sunley, Raymond Leo; and Snowling, Geoffrey David, 4,116,674, Cl. 71-92.000.

Snyder, Daniel S.; Luzsicza, Steven O.; and Pauer, Lyle A., to Gould Inc. Tire condition sensing apparatus. 4,117,452, Cl. 340-58.000.

Societe Anonyme de Telecommunications: *See—*
Lamelot, Pierre Marie Louis; and Mousson, Roland Georges, 4,117,327, Cl. 250-338.000.

Societe Chimique des Charbonnages: *See—*
Gillet, Philippe Jean; and Henrich, Gaston, 4,117,023, Cl. 260-671.00R.

Societe de Paris et du Rhone: *See—*
Mazzorana, Alfred Bruno, 4,116,077, Cl. 74-7.00A.

Societe Nationale des Poudres et Explosifs: *See—*
Lehn, Jean-Marie; Schue, Francois; Boileau, Sylvia; Kaempf, Bernd; Cau, Alain Andre; Moinard, Jean Robert; and Raynal, Serge Fernand, 4,116,887, Cl. 260-2.00A.

Societe Suisse pour l'Industrie Horlogere Management Services, S.A.: *See—*
Hurzeller, Peter; and Degiez, Louis, 4,117,283, Cl. 200-52.00R.

Sokolov, Lev Borisovich: *See—*
Korshak, Vasily Vladimirovich; Vinogradova, Svetlana Vasilievna; Storozhuk, Ivan Pavlovich; Valetsky, Petr Maximilianovich; Sokolov, Lev Borisovich; Mikitaev, Abdulakh Kazbulatovich; Askadsky, Andrei Alexandrovich; Kochergin, Jury Sergeevich; Slonimsky, Grigory Lvovich; Shirokova, Larisa Borisovna; Nebosenko, Ljudmila Fedorovna; and Zhuravlev, Nikolai Danilovich, 4,116,940, Cl. 528-173.000.

Sokurenko, Jury Varnavovich: *See—*
Maslov, Vadim Nikolaevich; Korobov, Oleg Evgenievich; Lupacheva, Alla Naumovna; Vlasov, Alexandr Nikolaevich; Myasoedov, Viktor Vasilievich; Bochkarev, Ellin Petrovich; Gimelfarb, Felix Aronovich; Bronshtein, Izidor Karlovich; Lukicheva, Natalya Ivanovna; Sinitsyn, Evgeny Vladimirovich; Sokurenko, Jury Varnavovich; Jurova, Elena Sergeevna; Kistova, Elena Mikhailovna; Konstantinova, Marina Andreevna; and Samaginov, Veniamin Mikhailovich, 4,117,504, Cl. 357-16.000.

Solarex Corporation: *See—*
Dominguez, Ramon, 4,116,207, Cl. 136-89.00H.

Soldatos, Anthony Constantine: *See—*
Olivo, Anthony Robert; Soldatos, Anthony Constantine; and Schultz, Sidney Joseph, 4,116,921, Cl. 260-38.000.

Solfan Systems, Inc.: *See—*
Lutz, Erno B., 4,117,464, Cl. 340-554.000.

Soloy Conversions, Ltd.: *See—*
Soloy, Joe I., 4,116,408, Cl. 244-114.00R.

Soloy, Joe I., to Soloy Conversions, Ltd. Portable heliport. 4,116,408, Cl. 244-114.00R.

SOLVAY, & Cie.: *See—*
Obsomer, Marc; Bodson, Luc; and Michel, Edmond, 4,116,609, Cl. 425-526.000.

Somkaite, Rozalija; and Toth, Bela, to Armour Pharmaceutical Company. Automated wet sieving apparatus. 4,116,824, Cl. 209-262.000.

Son, Chung H.: *See—*
Taylor, Paul G.; Son, Chung H.; Hom, Martha C.; Williams, L. G.; and Steel, Ronald E., 4,117,176, Cl. 426-660.000.

Sonitronic, Inc.: *See—*
Feaster, Donavon L., 4,117,280, Cl. 200-6.00B.

Soref, Richard A., to Beckman Instruments, Inc. Liquid crystal reflective display apparatus. 4,116,544, Cl. 350-336.000.

Sorensen, Soren Kaj; and Holbek, Carl Christian, to Radiometer A/S. Package containing a reference liquid for blood gas equipment. 4,116,336, Cl. 206-524.800.

Sosenko, Lev Matveevich: *See*—
Oborin, Pavel Alexandrovich; Gadaev, Anatoly Yakovlevich; Bikbau, Marsel Yanovich; Nudelman, Boris Izrailovich; Aronova, Irina Zelmanovna; Bulatov, Nail Yakubovich; and Sosenko, Lev Matveevich, 4,116,707, Cl. 106-104.000.

Sotchenko, Vladimir Petrovich: *See*—
Mozzhukhin, Anatoly Alexandrovich; and Sotchenko, Vladimir Petrovich, 4,116,375, Cl. 228-48.000.

Souhaite, Philippe, to Schlumberger Technology Corporation. Well logging apparatus with pad-mounted vertical electrode array for measuring the resistivity of the flushed zone. 4,117,394, Cl. 324-10.000.

Souma, Takashi: *See*—
Goto, Eiichi; Souma, Takashi; Idesawa, Masanori; and Tanaka, Kazumitsu, 4,117,340, Cl. 250-492.00A.

South Pacific Industries: *See*—
Johnson, Lawrence E.; Conger, William W., IV; and Moreland, Gerald W., 4,115,878, Cl. 4-172.170.

Southern Pacific Transportation Company: *See*—
Jaeklc, William M.; Byrne, Robert; and Giovanelli, Armand, 4,116,135, Cl. 105-378.000.

Spanset Inter A.G.: *See*—
Raue, Karl Moritz, 4,116,481, Cl. 294-74.000.

Speidel, Blasius. Deflation valve for blood pressure measuring devices. 4,116,217, Cl. 137-625.120.

Spencer, Dudley W. C. Horseshoe manufacture. 4,116,278, Cl. 168-4.000.

Sperry Rand Corporation: *See*—
McMahon, Donald H., 4,116,534, Cl. 350-157.000.
Shizume, Peter K., 4,117,484, Cl. 343-18.00E.

Spicer, Bruce G., to RTE Corporation. Spring actuated contact for high voltage bushing. 4,116,515, Cl. 339-12.00R.

Spiegel, Leonard Lee. Vehicle airflow control device. 4,116,482, Cl. 296-1.00S.

Spietschka, Ernst: *See*—
Gattner, Hans; Spietschka, Ernst; and Troster, Helmut, 4,116,923, Cl. 528-220.000.

Spinner, Ulrich: *See*—
Menth, Anton; Perry, Anthony J.; and Spinner, Ulrich, 4,116,726, Cl. 148-31.570.

Spitzer, Joseph George; Small, Marvin; Osipow, Lloyd I.; and Marra, Dorothea C. Vapor tap valve for aerosol containers used with flammable propellants. 4,116,370, Cl. 222-402.180.

Spoeth, Carl R., Jr.: *See*—
Henke, Fred G.; and Spoeth, Carl R., Jr., 4,117,045, Cl. 261-30.000.

Spolnicki, Jerzy, to Du Pont de Nemours, E. I., and Company. Product and process. 4,115,989, Cl. 57-140.0BY.

Sporri, Max, to Frush, John P. Portable apparatus for cleaning a dental prosthesis. 4,115,889, Cl. 15-21.00R.

Sprague Electric Company: *See*—
Ross, Sidney D.; Dunkl, Franz S.; and Finkelstein, Manuel, 4,117,531, Cl. 361-433.000.

Sprecker, Mark A.: *See*—
Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick Louis; and Vock, Manfred Hugo, 4,117,015, Cl. 260-586.00C.

Spritzer, Michael H.: *See*—
Langley, John Randolph; and Spritzer, Michael H., 4,116,160, Cl. 118-48.000.

Square D Company: *See*—
Reed, Ronald H.; Miracle, William C.; and McMullin, Dwain G., 4,117,530, Cl. 361-365.000.
Sever, Janez F., 4,116,308, Cl. 188-171.000.

Staats, Peter Francis, to General Electric Company. Patient positioning indication arrangement for a computed tomography system. 4,117,337, Cl. 250-445.00T.

Stablex AG: *See*—
Chappell, Christopher Lee, 4,116,705, Cl. 106-90.000.

Stacey, Alan J.: *See*—
Dorio, Martin M.; and Stacey, Alan J., 4,116,781, Cl. 204-98.000.

Stach, Leonard J.; Hotz, Roger D.; and Richter, Sidney B., to Velsicol Chemical Company. Dioxane substituted amides. 4,116,670, Cl. 71-88.000.

Stackhouse, James H., Jr.: *See*—
Silver, Hayden J., Jr.; and Stackhouse, James H., Jr., 4,116,356, Cl. 220-85.00R.

Staebler, Paul J., to Caterpillar Tractor Co. Heat exchanger having controllable cleaning means. 4,116,265, Cl. 165-95.000.

Stagemeyer, Merlin D.; and Allcorn, Seth Ford, to Oil Spill Recovery, Inc. Deployable barrier apron apparatus for use with contaminant recovery systems. 4,116,007, Cl. 405-66.000.

Stagemeyer, Merlin D.; and Allcorn, Seth Ford, to Oil Spill Recovery, Inc. Method and apparatus for removing contaminants from bodies of water. 4,116,833, Cl. 210-83.000.

Stahl, Uno Arne Ivan; and Hakansson, Nils Magnus. Method for printing combinations of signs in a predetermined number and in an irregular sequence. 4,116,129, Cl. 101-426.000.

Stahlecker, Fritz: *See*—
Stahlecker, Hans, 4,116,505, Cl. 308-187.000.

Stahlecker, Hans, to Stahlecker, Fritz; and Stahlecker, Hans. Bearing for a shaft of an open-end spinning rotor. 4,116,505, Cl. 308-187.000.

Stalick, Victor J., Jr.: *See*—
Thomas, Jay A.; and Stalick, Victor J., Jr., 4,117,352, Cl. 307-269.000.

Stamicarbon, B.V.: *See*—
Balg, Theodorus; Cramers, Constant M. A.; and Maessen, Hendrikus J. G., 4,117,000, Cl. 260-465.100.
Plantema, Otto G., 4,117,246, Cl. 568-821.000.

Standard Oil Company, The: *See*—
Li, George S.; and Rosen, Irving, 4,117,040, Cl. 260-899.000.
Li, George S., 4,117,218, Cl. 526-272.000.

Standard Oil Company, a corporation of Indiana: *See*—
Hanson, Robert B., 4,116,941, Cl. 260-29.20N.

Standard Pressed Steel Co.: *See*—
Ruediger, Frederick, 4,116,034, Cl. 72-387.000.

Stange, Klaus K.; Smith, Richard E ; Hamlin, Thomas J.; and Cassano, James R., to Xerox Corporation. Method for transporting and registering stacked sheets. 4,116,431, Cl. 271-236.000.

Stanley, Marion L., Jr., to Owens-Corning Fiberglas Corporation. Tank with water-sealable vent. 4,116,357, Cl. 220-205.000.

Stansbury, Benjamin, to American Hospital Supply Corporation. Highly stretchable glove and method of sizing same. 4,115,873, Cl. 2-163.000.

Staples, John L.: *See*—
Charles, Ronald A.; Jones, Paul W.; Staples, John L.; and Wiegner, Joseph R., 4,116,775, Cl. 195-103.50M.

Stargell, Donald E., to Van Dorn Company. Folded can end product. 4,116,361, Cl. 220-273.000.

Stargell, Donald E.: *See*—
McKernan, Bernard J.; and Stargell, Donald E., 4,116,360, Cl. 220-273.000.

Stark, Donald E.; Ehrlich, Anthony G.; and Guillaumin, Bruno, to Westinghouse Air Brake Company. Broken rail detecting track circuits. 4,117,529, Cl. 361-182.000.

Starks, Charles M.; and Lundeen, Allan J., to Continental Oil Company. Preparation of o-benzylphenol. 4,117,243, Cl. 568-744.000.

Statkov, Peter Radanow: *See*—
Molnar, Francois; Szabo, Suzanne; and Statkov, Peter Radanow, 4,117,160, Cl. 424-316.000.

Staub, Fred W.; and Morgan, Peter A., to Electric Power Research Institute, Inc. Gas distributor for fluidizing beds. 4,115,929, Cl. 34-10.000.

Staude, Rudolf: *See*—
Bammert, Karl; and Staude, Rudolf, 4,116,584, Cl. 415-199.500.

Stauffer, Adolf: *See*—
Fechner, Joachim; Fiebig, Siegward; Fischer, Friedrich; Fischer, Herbert; Hellmer, Lars; Riedel, Konrad; Stauffer, Adolf; and Sud, Kuldip, 4,117,101, Cl. 423-569.000.

Stauffer Chemical Company: *See*—
Baker, Don R.; and Walker, Francis H., 4,117,010, Cl. 260-561.00S.
Baker, Don R.; and Walker, Francis H., 4,117,166, Cl. 424-324.000.
Fancher, Llewellyn W.; and Robbins, Jeffrey D., 4,117,043, Cl. 260-938.000.
Gaughan, Edmund J.; and Large, George B., 4,116,668, Cl. 71-88.000.
Walker, Francis H.; and Baker, Don R., 4,116,677, Cl. 71-118.000.
Wallace, Edwin G., 4,117,153, Cl. 424-286.000.

Staver Company, Incorporated, The: *See*—
Skrobisch, Alfred, 4,117,478, Cl. 340-378.00R.

Steel, Ronald E.: *See*—
Taylor, Paul G.; Son, Chung H.; Hom, Martha C.; Williams, L. G.; and Steel, Ronald E., 4,117,176, Cl. 426-660.000.

Steffancin, William, to Borg-Warner Corporation. Amorphous polyester graft polymer alloys. 4,117,034, Cl. 260-873.000.

Stehmann, Hans Peter: *See*—
Voigt, Hermann Uwe; Volker, Martin; and Stehmann, Hans Peter, 4,117,063, Cl. 264-102.000.

Stein, Charles R., to General Electric Company. Control electro-optical device utilizing liquid crystal. 4,116,543, Cl. 350-333.000.

Stein, Stanley, to Hoffmann-La Roche Inc. Liquid chromatography system. 4,116,046, Cl. 73-61.10C.

Steinbeck, Hans-Heinz: *See*—
Brunner, Friedrich Christian; Schwerdt, Friedrich Wilhelm; and Steinbeck, Hans-Heinz, 4,117,093, Cl. 423-339.000.

Steiner, Edwin C., to Dow Chemical Company, The. Polyvinylbenzyl ethers of polyphenols, their polymers and copolymers. 4,116,936, Cl. 526-286.000.

Steiner, Eginhard: *See*—
Beffa, Fabio; Back, Gerhard; and Steiner, Eginhard, 4,116,952, Cl. 260-145.00B.

Steinle, Georg: *See*—
Schiweck, Hubert; Steinle, Georg; Muller, Lutz; Gau, Wolfgang; and Munir, Mohammad, 4,117,173, Cl. 426-548.000.

Stempin, John L.; and Wexell, Dale R., to Corning Glass Works. Composite foamable cements. 4,116,703, Cl. 106-75.000.

Stephen, John F.: *See*—
Dexter, Martin; Knell, Martin; Klemchuk, Peter; and Stephen, John F., 4,116,930, Cl. 260-45.80N.

Stephens, Donald Harrison: *See*—
Hildreth, Bradrick Alan; and Stephens, Donald Harrison, 4,117,444, Cl. 338-198.000.

Stephenson, Lorne, to American Sign & Indicator Corporation. Display and reset apparatus. 4,115,941, Cl. 40-452.000.

Stetter, Jorg; Hammann, Ingeborg; Homeyer, Bernhard; and Behrenz, Wolfgang, to Bayer Aktiengesellschaft. Pesticidally active novel oxime-carbamates of fluorinated ketones. 4,117,154, Cl. 424-298.000.

Steube, Kenneth E., to McDonnell Douglas Corporation. Dual tumbling barrel plating apparatus. 4,116,161, Cl. 118-49.100.

Stewart, Douglas Edward: *See*—
Wilson, William George Moore; and Stewart, Douglas Edward, 4,117,331, Cl. 250-334.000.

Stibbe, Paul H., to TEC Systems, Inc. Web drying apparatus having means for heating recirculated air. 4,116,620, Cl. 432-59.000.

Stickler, Heinz. Scraping tool. 4,115,892, Cl. 15-105.000.

Stilwell, George Raymond, Jr.: *See—*
Schlig, Eugene Stewart; and Stilwell, George Raymond, Jr., 4,117,471, Cl. 340-324.00M.

Stinger, Henry Joseph, to Du Pont de Nemours, E. I., and Company. Electrically curable, elastomeric sealing strip. 4,117,189, Cl. 428-323.000.

Stockner, Josef; and Wildmoser, Alfred, to Linde Aktiengesellschaft. Apparatus for introducing gas into a liquid. 4,117,048, Cl. 261-93.000.

Stolka, Milan; Pearson, James M.; and Yanus, John F., to Xerox Corporation. Process for preparation of 2-anthryl and substituted 2-anthryl functional monomers and polymers. 4,117,239, Cl. 560-221.000.

Stone, Andrew Joseph. Toilet flushing assembly. 4,115,881, Cl. 4-326.000.

Stone, Jacob E., to Exxon Production Research Company. Vibrator tilt control system for vehicle mounted seismic vibrators. 4,116,300, Cl. 181-114.000.

Stookey, George K., to Indiana University Foundation. Dentifrice preparation. 4,117,109, Cl. 424-57.000.

Stork Amsterdam B.V.: *See—*
Bogaard, Hendricus Johannes Maria, 4,116,117, Cl. 99-361.000.

Storozhuk, Ivan Pavlovich: *See—*
Korshak, Vasily Vladimirovich; Vinogradova, Svetlana Vasilievna; Storozhuk, Ivan Pavlovich; Valetsky, Petr Maximilianovich; Sokolov, Lev Borisovich; Mikitaev, Abdulakh Kazbulatovich; Askadsky, Andrei Alexandrovich; Kochergin, Jury Sergeevich; Slonimsky, Grigory Lvovich; Shirokova, Larisa Borisovna; Nebosenko, Ljudmila Fedorovna; and Zhuravlev, Nikolai Danilovich, 4,116,940, Cl. 528-173.000.

Stotz, Wolf-Gunter; and Holik, Herbert, to Escher Wyss GmbH. Separating system for wires of a double-wire paper-making machine. 4,116,763, Cl. 162-301.000.

Stover, Don A.; Young, Norman R.; and Runnion, Glenmore J., to Unarco Industries, Inc. Shopping cart. 4,116,456, Cl. 280-33.99B.

Stover, John C.: *See—*
Boggs, Alben C.; and Stover, John C., 4,117,308, Cl. 219-365.000.

Stowell, Donald E.: *See—*
Bendig, Larry L.; Siemsen, Cathy S.; and Stowell, Donald E., 4,116,882, Cl. 252-448.000.

Straitz, John F., III, to Combustion Unlimited Incorporated. Flame retention apparatus for flares. 4,116,618, Cl. 431-202.000.

Stratton, Boyd Lehman; and Nichols, William E., to Arvin Industries, Inc. Flexible disc recorder with skewed transducer transport. 4,117,521, Cl. 360-99.000.

Strauss, Karl-Peter, to Rollei-Werke Franke & Heidecke. Photographic camera with automatic exposure control. 4,117,499, Cl. 354-23.00D.

Strauts, Eric J., to Magnaflux Corporation. Portable X-ray unit with self-contained voltage supply. 4,117,334, Cl. 250-402.000.

Streeter, Kenneth R., to Eaton Corporation. Fluid coupling device and bimetal coil adjustment for use therein. 4,116,316, Cl. 192-58.00A.

Streeter, Kenneth R., to Eaton Corporation. Fluid coupling device with improved disengaged operating characteristics. 4,116,317, Cl. 192-58.00B.

Streich, Georg; and Bauer, Johann, to Siemens Aktiengesellschaft. Electro-magnetic switching apparatus having electrically separated contact elements. 4,117,428, Cl. 335-132.000.

Streich, Georg; and Bauer, Johann, to Siemens Aktiengesellschaft. Electromagnetic switching apparatus. 4,117,429, Cl. 335-132.000.

Strelkov, Konstantin Sergeevich: *See—*
Bulychev, Gennady Alexeevich; Bykovsky, Anatoly Vladimirovich; Machigin, Stanislav Pavlovich; and Strelkov, Konstantin Sergeevich, 4,116,056, Cl. 73-147.000.

Striebel, Heini Paul: *See—*
Loewe, Werner; and Striebel, Heini Paul, 4,117,156, Cl. 424-302.000.

Strohmeier, Warren: *See—*
Herzl, Peter J.; and Strohmeier, Warren, 4,116,058, Cl. 73-194.0VS.

Stromberg-Carlson Corporation: *See—*
Bartlett, William F., 4,117,268, Cl. 179-15.0AT.

Stuart, Alexander; and Paterson, Thomas, to Burroughs Wellcome Co. Organic synthetic methods benzylpyrimidine derivatives. 4,116,958, Cl. 544-325.000.

Sturm, Werner, to Von Roll AG. Electric welding muff. 4,117,311, Cl. 219-544.000.

Sturtevant, Howard. Portable bathroom cabinet. 4,116,508, Cl. 312-245.000.

Sud, Kuldip: *See—*
Fechner, Joachim; Fiebig, Siegward; Fischer, Friedrich; Fischer, Herbert; Hellmer, Lars; Riedel, Konrad; Stauffer, Adolf; and Sud, Kuldip, 4,117,101, Cl. 423-569.000.

Sud, Kuldip Kumar: *See—*
Hellmer, Lars; Koller, Gerald; Al Muddarris, Ghazi Rashid; and Sud, Kuldip Kumar, 4,117,100, Cl. 423-569.000.

Suddeutsche Zucker-Aktiengesellschaft: *See—*
Schiweck, Hubert; Steinle, Georg; Muller, Lutz; Gau, Wolfgang; and Munir, Mohammad, 4,117,173, Cl. 426-548.000.

Suechting, Henry William, Jr.: *See—*
Barnes, Theodore Marion; Shindelar, Joseph John; Bass, Merlyn Duane; and Suechting, Henry William, Jr., 4,115,983, Cl. 56-98.000.

Sugahara, Yujiro; Noshi, Yoshibumi; Naito, Hiroyuki; Saito, Mamoru; Takahashi, Akira; and Tuchida, Hisashi, to Mizusawa Kagaku Kogyo Kabushiki Kaisha. Novel lead monoxide and process for preparation thereof. 4,117,104, Cl. 423-619.000.

Sugita, Jitsuo: *See—*
Yukinaga, Hisajiro; Sumimoto, Shinzaburo; Ishizuka, Ichiro; and Sugita, Jitsuo, 4,116,671, Cl. 71-88.000.

Sugita, Yoshimitsu: *See—*
Shimizu, Hirofumi; Yoshinaka, Akira; and Sugita, Yoshimitsu, 4,116,719, Cl. 148-1.500.

Sugiura, Kensuke; Miyagawa, Toru; and Seki, Haruo, to Nippon Oil Co., Ltd. Compressor oil compositions. 4,116,874, Cl. 252-46.700.

Sugiyama, Akira: *See—*
Minohara, Kiyomi; and Sugiyama, Akira, 4,117,487, Cl. 343-100.0SA.

Sukornick, Bernard: *See—*
Minhas, Pritam S.; and Sukornick, Bernard, 4,116,931, Cl. 260-45.75B.

Sullivan, Ann Clare: *See—*
Gallo-Torres, Hugo; Hamilton, James Guthrie; and Sullivan, Ann Clare, 4,117,121, Cl. 424-238.000.

Sullivan, Gerald Leslie. Pendulous induction compass transmitter with means to compensate for heading errors in turns due to the vertical component of the Earth's magnetic field and due to two cycle error. 4,116,057, Cl. 73-178.00R.

Sulzer Brothers Limited: *See—*
Bucher, Robert, 4,116,242, Cl. 139-59.000.

Sumimoto, Shinzaburo: *See—*
Yukinaga, Hisajiro; Sumimoto, Shinzaburo; Ishizuka, Ichiro; and Sugita, Jitsuo, 4,116,671, Cl. 71-88.000.

Sumitomo Chemical Company, Ltd.: *See—*
Hisada, Yoshio; Maeda, Kiyoto; and Agui, Hideo, 4,117,136, Cl. 424-258.000.
Yamada, Hirotada; Okamura, Kosaku; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,117,126, Cl. 424-246.000.

Sumitomo Metal Industries, Ltd.: *See—*
Okamoto, Toyohiko; Misaka, Yoshisuke; and Asakawa, Motoo, 4,116,028, Cl. 72-21.000.

Sun, Yun Chung, to Dow Chemical Company, The. Method of producing valuable alkylated aromatic hydrocarbons from tar. 4,117,020, Cl. 260-668.00C.

Sunago, Hirofumi; and Migitaka, Wataru, to Nittetsu Chemical Industrial Co., Ltd. Process for preparing needle coal pitch coke. 4,116,815, Cl. 208-87.000.

Sunday, Brooks R.: *See—*
Schwender, Charles F.; and Sunday, Brooks R., 4,116,961, Cl. 260-293.570.

Sunley, Raymond Leo; and Snowling, Geoffrey David, to Imperial Chemical Industries Limited. Process of severely damaging or killing unwanted plants with pyrimidine compounds. 4,116,674, Cl. 71-92.000.

Surgical Applicance Industries, Inc.: *See—*
Albert, William J., 4,116,236, Cl. 128-80.00C.

Survival Technology, Inc.: *See—*
Kaplan, Sheldon; Curley, Edward M.; and Homan, Gerlof, 4,116,196, Cl. 128-272.300.

Susdorf, Roman; and Engelmann, Heinz, to Siemens Aktiengesellschaft. Drive for an electric rail motor car. 4,116,091, Cl. 74-801.000.

Sutherland, James D.: *See—*
Jones, Robert J.; O'Rell, Michael K.; and Sutherland, James D., 4,116,937, Cl. 528-170.000.

Suzaki, Masayuki: *See—*
Suzuki, Takami; Suzaki, Masayuki; and Moriya, Tomoyuki, 4,116,568, Cl. 400-320.000.

Suzuki, Hiroshige: *See—*
Hosaka, Takuo; Sasaki, Tadao; and Suzuki, Hiroshige, 4,117,096, Cl. 423-345.000.

Suzuki, Masahiko: *See—*
Kishimoto, Keiichi; and Suzuki, Masahiko, 4,116,935, Cl. 528-34.000.

Suzuki, Masao: *See—*
Shibata, Tsuneo; Maki, Masao; Suzuki, Masao; and Kawabe, Hidehiko, 4,116,881, Cl. 252-440.000.

Suzuki, Osamu: *See—*
Akashi, Goro; Suzuki, Osamu; and Fujiyama, Masaaki, 4,117,190, Cl. 428-325.000.

Suzuki, Sumio: *See—*
Imahori, Seiichi; Murata, Yukichi; and Suzuki, Sumio, 4,116,623, Cl. 8-25.000.

Suzuki, Takami; Suzaki, Masayuki; and Moriya, Tomoyuki, to Ricoh Co., Ltd. Carriage driving mechanism for printer. 4,116,568, Cl. 400-320.000.

Suzuki, Takashi; Ikezawa, Tsutomu; and Ogasawara, Kazui, to Amada Company, Limited. Gang slitting machine. 4,116,098, Cl. 83-425.400.

Suzuki, Tetsumi: *See—*
Kakogawa, Genjiro; Suzuki, Tetsumi; Goko, Nobuaki; and Mukuraguchi, Koji, 4,117,219, Cl. 528-494.000.

Suzuki, Yoshikatsu: *See—*
Honda, Toshio; Tanuma, Itsuo; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; and Suzuki, Yoshikatsu, 4,117,036, Cl. 260-878.00R.

Suzuki, Yoshiro: *See—*
Nishikawa, Masaji; Suzuki, Yoshiro; and Takasugi, Noboru, 4,116,141, Cl. 118-648.000.

Svens, Alvar A. Method of creating an embossing effect. 4,116,737, Cl. 156-85.000.

Svensson, Assar, to Skega AB. Loading cage for bulk goods. 4,116,485, Cl. 296-39.00R.

Svoboda, Josef: *See*—
Krob, Erwin; and Svoboda, Josef, 4,116,461, Cl. 280-605.000.
Swander, Kenneth D., Jr.; and Sibley, Bruce D., to Aeroquip Corporation. Double piston brake actuator. 4,116,114, Cl. 92-130.00A.
Swank, Roy L., to Pioneer Filters, Inc. High capacity blood transfusion micro filter. 4,116,845, Cl. 210-446.000.
Swarbrick, Peter; Green, William John; and Maillefer, Charles, to BICC Limited; and Etablissements Maillefer SA. Manufacture of extruded products. 4,117,195, Cl. 428-379.000.
Swartz, Dorman J.: *See*—
Smith, Robert E.; Chytil, Frank S.; Feldstein, George; and Swartz, Dorman J., 4,116,394, Cl. 242-25.00R.
Sweeney, Joseph Patrick: *See*—
Grabbe, Dimitry G.; and Sweeney, Joseph Patrick, 4,116,519, Cl. 339-17.0CF.
Swift, Harold E.: *See*—
Hupp, Stephen S.; Sabourin, Edward T.; Swift, Harold E.; and Vogel, Roger F., 4,117,021, Cl. 260-669.00A.
Kobylinski, Thaddeus P.; and Swift, Harold E., 4,116,995, Cl. 260-449.60M.
Syska, Andrew J., to Consolidated Natural Gas Service Company. Gaseous and liquid fuel burner. 4,116,611, Cl. 431-353.000.
Szabo, Andras I.: *See*—
Zitelli, William E.; and Szabo, Andras I., 4,117,477, Cl. 340-347.0NT.
Szabo, Suzanne: *See*—
Molnar, Francois; Szabo, Suzanne; and Statkov, Peter Radanow, 4,117,160, Cl. 424-316.000.
Sze, Morgan C.: *See*—
Gelbein, Abraham P.; and Sze, Morgan C., 4,116,967, Cl. 260-295.50R.
Szekely, Geza: *See*—
Huszar, Andor; Szekely, Geza; Rusznak, Istan; Trezl, Lajos; Bertalan, Gyorgy; Zaoui nee Serfozo, Ilona; and Molnar, Imre, 4,116,897, Cl. 260-17.40R.
Tagami, Katsutoshi: *See*—
Hazumi, Kenji; and Tagami, Katsutoshi, 4,117,389, Cl. 322-47.000.
Taisei Kosan Kabushiki Kaisha: *See*—
Kamezaki, Masaaki, 4,116,213, Cl. 137-360.000.
Takagi, Yoshiaki: *See*—
Hayashi, Tadayoshi; Takagi, Yoshiaki; Toizume, Tetsuo; and Umeda, Masakazu, 4,116,884, Cl. 252-470.000.
Takahashi, Akira: *See*—
Sugahara, Yujiro; Noshi, Yoshibumi; Naito, Hiroyuki; Saito, Mamoru; Takahashi, Akira; and Tuchida, Hisashi, 4,117,104, Cl. 423-619.000.
Takahashi, Atsushi: *See*—
Mizuguchi, Ryuzo; Takahashi, Atsushi; and Ishikura, Shinichi, 4,116,912, Cl. 260-29.4UA.
Takahashi, Nobuo: *See*—
Takahashi, Yuzo; Wazima, Yoshimi; Nakada, Akira; Tanaka, Yasuyuki; Nagai, Katsumi; Takahashi, Nobuo; Matsuda, Hiroshi; Aizawa, Eizi; and Oyama, Shiro, 4,117,188, Cl. 428-36.000.
Takahashi, Susumu; and Iida, Hiroshi, to Sansui Electric Co., Ltd. Muting arrangement for AM synchronous detector using a PLL circuit. 4,117,406, Cl. 325-348.000.
Takahashi, Wataru: *See*—
Itoh, Kametaro; Takahashi, Wataru; Yamamoto, Yoshun; and Harajiri, Hachiro, 4,116,716, Cl. 134-134.000.
Takahashi, Yuzo; Wazima, Yoshimi; Nakada, Akira; Tanaka, Yasuyuki; Nagai, Katsumi; Takahashi, Nobuo; Matsuda, Hiroshi; Aizawa, Eizi; and Oyama, Shiro, to Hokkai Can Co. Ltd. Lapped seam can. 4,117,188, Cl. 428-36.000.
Takasugi, Noboru: *See*—
Nishikawa, Masaji; Suzuki, Yoshiro; and Takasugi, Noboru, 4,116,141, Cl. 118-648.000.
Takatsy, Gyula; Barb, Katalin; Muranyi, Istvan; and Burda, Ferencne, to Labor Muszeripari Muvek. Apparatus for and a method of the determination of influenza neuraminidase. 4,116,777, Cl. 195-127.000.
Takatuki, Toyohiko: *See*—
Takenakashima, Takefumi; and Takatuki, Toyohiko, 4,116,366, Cl. 222-131.000.
Takaya, Hiroshi: *See*—
Kawasaki, Hideo; Nakatani, Masaji; Ishii, Toshihiro; Nakagawa, Hiroshi; and Takaya, Hiroshi, 4,117,080, Cl. 423-235.000.
Takeda Chemical Industries, Ltd.: *See*—
Meguro, Kanji; and Kuwada, Yutaka, 4,116,956, Cl. 260-239.0BD.
Takeda, Kiyohiro: *See*—
Kikura, Katsuaki; Nomura, Hiroshi; and Takeda, Kiyohiro, 4,116,190, Cl. 123-202.000.
Takeda, Susumu; and Hazama, Kiyoaki, to Konishiroku Photo Industry Co., Ltd. Camera provided with recorder for light of light source. 4,117,502, Cl. 354-106.000.
Takenakashima, Takefumi; and Takatuki, Toyohiko, to Zojirushi Vacuum Bottle Co., Ltd. Vacuum bottle container with air pump having vent closing switch. 4,116,366, Cl. 222-131.000.
Takeshima, Hideyuki, to Hiroshi Kawamula. Golf club grip. 4,116,440, Cl. 273-81.400.
Tamao, Yoshikuni: *See*—
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,117,127, Cl. 424-247.000.
Tamura, Hiroshi: *See*—
Machida, Hazime; Tamura, Hiroshi; and Murakami, Kakuji, 4,116,698, Cl. 106-2.000.
Tan, Sing Liong: *See*—
Carasso, Marino Giuseppe; van de Polder, Leendert Johan; and Tan, Sing Liong, 4,117,515, Cl. 358-217.000.
Tanaca, Masaaki: *See*—
Nohira, Hidetaka; and Tanaca, Masaaki, 4,117,046, Cl. 261-44.00C.
Tanahashi, Sakae; and Shima, Takashi, to Kabushiki Kaisha Komatsu Seisakusho. Press load meter. 4,116,050, Cl. 73-88.50R.
Tanaka, Ichiro: *See*—
Abe, Nobuyuki; Watanabe, Osamu; Nunokawa, Koji; Tanaka, Ichiro; and Manabe, Masao, 4,116,012, Cl. 405-238.000.
Tanaka, Junichi: *See*—
Ishikawa, Toshikatsu; Tanaka, Junichi; Tominaga, Yoichiro; Matsubara, Kunio; Kitazume, Yoshihiko; and Hayase, Tokuji, 4,117,051, Cl. 264-29.100.
Tanaka, Kazumitsu: *See*—
Goto, Eiichi; Souma, Takashi; Idesawa, Masanori; and Tanaka, Kazumitsu, 4,117,340, Cl. 250-492.00A.
Tanaka, Satoru; and Watanabe, Hideaki, to Eisai Co., Ltd. 1,3-Benzodioxol derivatives. 4,117,228, Cl. 544-377.000.
Tanaka, Shoji: *See*—
Honda, Toshio; Tanuma, Itsuo; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; and Suzuki, Yoshikatsu, 4,117,036, Cl. 260-878.00R.
Tanaka, Susumu; Ogawa, Masaya; Kawabata, Hidetoshi; Fujiwara, Takao; Kurita, Takaji; Enoguchi, Yuji; Wada, Kenichi; and Murasaki, Hiroshi, to Minolta Camera Kabushiki Kaisha. Electrophotographic copying apparatus. 4,116,556, Cl. 355-3.0SH.
Tanaka, Tadayoshi: *See*—
Sawata, Shinji; Tani, Tatsuo; Tanaka, Tadayoshi; and Horigome, Takashi, 4,116,266, Cl. 165-105.000.
Tanaka, Yasuyuki: *See*—
Takahashi, Yuzo; Wazima, Yoshimi; Nakada, Akira; Tanaka, Yasuyuki; Nagai, Katsumi; Takahashi, Nobuo; Matsuda, Hiroshi; Aizawa, Eizi; and Oyama, Shiro, 4,117,188, Cl. 428-36.000.
Tani, Tatsuo: *See*—
Sawata, Shinji; Tani, Tatsuo; Tanaka, Tadayoshi; and Horigome, Takashi, 4,116,266, Cl. 165-105.000.
Taniguchi, Katsutoshi; and Kuroda, Yoji, to Teijin Limited. Friction false-twisting device. 4,115,987, Cl. 57-77.400.
Tanimoto, Akira; Yoshida, Yukihiro; and Katoh, Sunao, to Sharp Kabushiki Kaisha. Stitch pattern forming control in a sewing machine. 4,116,144, Cl. 112-158.00E.
Tannery, Edward F., to Theodore Bargman Company. Door lock. 4,116,027, Cl. 70-472.000.
Tanno, Norihiko: *See*—
Yamada, Hirotada; Okamura, Kosaku; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,117,126, Cl. 424-246.000.
Tanuma, Itsuo: *See*—
Honda, Toshio; Tanuma, Itsuo; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; and Suzuki, Yoshikatsu, 4,117,036, Cl. 260-878.00R.
Tappe, Wilhelm: *See*—
Fabian, Wolfgang; Kopineck, Hermann-Josef; and Tappe, Wilhelm, 4,116,029, Cl. 72-34.000.
Tardivel, Jacques, to Degremont. Method and means for the automatic regulation of sludge extraction in sewage treatment apparatus. 4,116,832, Cl. 210-83.000.
Tarver, Gilbert W.; and Koons, Russell E., to Lion Oil Company. Asphalt coating compositions. 4,116,708, Cl. 106-281.00R.
Tatarintsev, Vladimir Mikhailovich: *See*—
Alexandrov, Vladimir Ilich; Osiko, Vyacheslav Vasilievich; Tatarintsev, Vladimir Mikhailovich; and Udovenchik, Viktor Timofeevich, 4,116,598, Cl. 425-174.80R.
Tate & Lyle Limited: *See*—
Khan, Riaz Ahmed; Mufti, Khizar Sultan; and Parker, Kenneth John, 4,117,224, Cl. 536-119.000.
Tatematsu, Kazuhisa: *See*—
Nomura, Kenichiro; Mori, Mamoru; Yasumatsu, Jun; Kubota, Tatsushi; Hachisuka, Sadao; and Tatematsu, Kazuhisa, 4,116,402, Cl. 242-107.100.
Tates, Donald W.: *See*—
VanBuskirk, Warren T.; and Tates, Donald W., 4,116,429, Cl. 271-173.000.
Tatsumoto, Katsunobu; and Fukuda, Kenji, to Mitsui Mining Company, Limited; and Mitsui Coke Co., Ltd. Process for manufacturing a carbonaceous material. 4,117,098, Cl. 423-448.000.
Tatsuta, Sumitaka; Hirose, Masuhiko; and Amari, Hiroshi, to Fuji Photo Film Co., Ltd. Photographic material. 4,116,696, Cl. 96-87.00R.
Taube, Robert Otto: *See*—
Rehn, Gary Allen; and Taube, Robert Otto, 4,116,280, Cl. 172-266.000.
Tawn, Alec Richard Hornsey: *See*—
Hudson, Alan George; and Tawn, Alec Richard Hornsey, 4,117,241, Cl. 560-224.000.
Taylor, Glenn Alfred: *See*—
Foster, Robert Dean; Maliszewski, Thomas Arthur; Sims, Joseph Alton, Jr.; and Taylor, Glenn Alfred, 4,117,250, Cl. 568-858.000.
Taylor, Glenn N., to Kendall Company, The. Brace hinge. 4,115,902, Cl. 16-179.000.
Taylor, Lynn J., to Owens-Illinois, Inc. Novel preparation of novel low molecular weight, liquid polymer. 4,117,235, Cl. 560-205.000.
Taylor, Maurice J.; Peek, Henry L.; Abdou, John J.; and Patel, Amrut

R., to Allis-Chalmers Corporation. Single tank multibreaker circuit interrupter. 4,117,289, Cl. 200-148.00B.

Taylor, Paul G.; Son, Chung H.; Hom, Martha C.; Williams, L. G.; and Steel, Ronald E., to Del Monte Corporation. Fruit-flavored candy product. 4,117,176, Cl. 426-660.000.

Taylor, Philip H.: *See—*
Magnall, Anthony N.; Taylor, Philip H.; and Roberts, Fred, 4,115,991, Cl. 57-153.000.

Taylor, Stanford Earl; and Brucat, John N., to Instructional/Communications Technology, Inc. Tachistoscopic focus control. 4,116,547, Cl. 351-31.000.

TBA Industrial Products Ltd.: *See—*
Magnall, Anthony N.; Taylor, Philip H.; and Roberts, Fred, 4,115,991, Cl. 57-153.000.

TDK Electronics Co., Ltd.: *See—*
Ishino, Ken; and Watanabe, Takashi, 4,116,906, Cl. 260-22.00A.

TEC Systems, Inc.: *See—*
Stibbe, Paul H., 4,116,620, Cl. 432-59.000.

Technar Incorporated: *See—*
Bell, Lon E., 4,116,132, Cl. 102-200.000.

Teeter, Wallis L.; and Richter, David J., to United States of America, Navy. Inductive communication system. 4,117,271, Cl. 179-82.000.

Teijin Limited: *See—*
Ichikawa, Yataro; Yamamoto, Mamoru; Tsuruta, Hideki; Kato, Kenichi; Yamaji, Teizo; Yoshisato, Eishin; and Hiramatsu, Toshiyuki, 4,116,955, Cl. 260-192.000.
Taniguchi, Katsutoshi; and Kuroda, Yoji, 4,115,987, Cl. 57-77.400.

Teijin Seiki Company Limitejd: *See—*
Fukui, Kiyozumi, 4,116,293, Cl. 180-43.00B.

Teisseire, Paul Jose. Process for the production of norpatchoulenol. 4,117,245, Cl. 568-817.000.

Tekken Construction Co. Ltd.: *See—*
Yamazaki, Hironobu; Uchida, Yoshiaki; and Nakaya, Akira, 4,116,487, Cl. 299-1.000.

Tekram Associates: *See—*
Brosenius, Karl Hilding, 4,115,953, Cl. 49-125.000.

Telaris Telecommunications, Inc.: *See—*
Hayes, James Christopher; and Tobin, William James, 4,117,292, Cl. 200-340.000.

Telcon Metals Limited: *See—*
Major, Rodney Victor, 4,116,727, Cl. 148-31.550.

Teldix GmbH: *See—*
Wehde, Heinz, 4,117,359, Cl. 310-67.00R.

Telic Corporation: *See—*
Penfold, Alan S.; and Thornton, John A., 4,116,793, Cl. 204-192.00R.
Penfold, Alan S.; and Thornton, John A., 4,116,794, Cl. 204-192.00R.

Temple, Robert Dwight; Bryan, William Thomas; and Willig, Carl Joseph, to Procter & Gamble Company, The. Detergent compositions containing starch. 4,116,854, Cl. 252-167.000.

Terpin, Janez: *See—*
Mittenzwei, Hellmut; and Terpin, Janez, 4,116,948, Cl. 260-112.00R.

Terra Tek, Inc.: *See—*
Barker, Lynn Marshall, 4,116,049, Cl. 73-87.000.

Ter-Saakov, Eduard Isaakovich: *See—*
Lezgintsev, Georgy Mikhailovich; Istoshin, Stanislav Jurievich; Belyavsky, Mikhail Anatolievich; Kontar, Evgeny Alexeevich; Koptyazhin, Nikolai Nikolaevich; Agaltsov, Georgy Ivanovich; Chernov, Boris Serafimovich; Ter-Saakov, Eduard Isaakovich; and Shkatov, Evgeny Petrovich, 4,116,069, Cl. 73-425.200.

Terui, Yasuaki; and Yoshino, Masaru, to Matsushita Electric Industrial Co., Ltd. Solid state imaging device. 4,117,514, Cl. 358-213.000.

Tesch, Bernhard: *See—*
Zwyssig, Robert; and Tesch, Bernhard, 4,115,904, Cl. 24-19.000.

Tetenborg, Konrad: *See—*
Langemeyer, Carl; and Tetenborg, Konrad, 4,115,978, Cl. 53-570.000.

Texaco Development Corp.: *See—*
Brennan, Michael E., 4,117,227, Cl. 544-170.000.
Schulze, Heinz; and Waddill, Harold G., 4,116,938, Cl. 528-93.000.

Texaco Inc.: *See—*
Silver, Hayden J., Jr.; and Stackhouse, James H., Jr., 4,116,356, Cl. 220-85.00R.

Texas Alkyls, Inc.: *See—*
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Texas Instruments Incorporated: *See—*
Bellavance, David W.; and Campbell, Joe C., 4,116,530, Cl. 350-96.120.
Blocher, John M., Jr.; and Browning, Melvin F., 4,117,094, Cl. 423-342.000.

Tezuka, Tohru: *See—*
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,117,127, Cl. 424-247.000.

Theeuwes, Felix; and Ayer, Atul D., to Alza Corporation. Osmotic system with laminated wall comprising structurally different semipermeable lamina. 4,116,241, Cl. 128-260.000.

Theochem Laboratories, Inc.: *See—*
Ruck, J. Barry, 4,116,850, Cl. 252-103.000.

Theodore Bargman Company: *See—*
Tannery, Edward F., 4,116,027, Cl. 70-472.000.

Thermon Manufacturing Company: *See—*
Johnson, Ben C.; Thornton, J. Scott; Glowe, Donald E.; Cassidy, Patrick E.; and Anderson, Robert E., 4,117,312, Cl. 219-548.000.

Thies, Peter Willibrord; and David, Samuel, to Kali-Chemie Pharma GmbH. 2,9-Dioxatricyclo [4,3,1,0,3,7] decane derivatives, processes for their preparation and pharmaceutical compositions thereof. 4,117,148, Cl. 424-278.000.

Tholen, Bengt Olov; and Hedstrom, Hans Ivar, to Kuab Konsult och Utveckling AB. Apparatus for bearing capacity measurement with a falling weight deflectometer. 4,116,041, Cl. 73-12.000.

Thoma, Wilhelm; Wulff, Jochen; and Niederdellmann, Georg, to Bayer Aktiengesellschaft. Textile coating with polyurethanes. 4,116,741, Cl. 156-239.000.

Thomas, David E. Non-perverting mirror. 4,116,540, Cl. 350-293.000.

Thomas, Harry L., to GTE Sylvania Incorporated. Temperature sensor holding device. 4,117,257, Cl. 174-52.00R.

Thomas, Jay A.; and Stalick, Victor J., Jr., to GTE Automatic Electric Laboratories Incorporated. Integrated clock drive circuit. 4,117,352, Cl. 307-269.000.

Thompson, Francis M.: *See—*
O'Farrell, Charles P.; Malloy, Paul L.; and Thompson, Francis M., 4,117,186, Cl. 428-265.000.

Thompson, Roger E., to R.E.T. Nominees Pty. Ltd. Game net support apparatus. 4,116,446, Cl. 273-181.00F.

Thornton, J. Scott: *See—*
Johnson, Ben C.; Thornton, J. Scott; Glowe, Donald E.; Cassidy, Patrick E.; and Anderson, Robert E., 4,117,312, Cl. 219-548.000.

Thornton, John A.: *See—*
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Penfold, Alan S.; and Thornton, John A., 4,116,794, Cl. 204-192.00R.

Thornton, John Robert: *See—*
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Thorsoe, Flemming: *See—*
Iversen, Poul Christian Carlos; Thorsoe, Flemming; and Hanson, Borge Bernhard, 4,117,307, Cl. 219-364.000.

Thut, Kurt: *See—*
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Thym, Sabine: *See—*
Pommer, Ernst-Heinrich; Thym, Sabine; and Reuther, Wolfgang, 4,117,150, Cl. 424-285.000.

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Anderl, Richard F.; and Tienor, Lawrence J., 4,115,918, Cl. 29-611.000.

Tiersten, Harry F.; McDonald, John F.; and Das, Pankaj K. Monolithic mosaic piezoelectric transducer utilizing trapped energy modes. 4,117,074, Cl. 310-320.000.

Tikhova, Nina Mikhailovna; Blokhina, Valentina Alexeevna; Antipova, Antonina Petrovna; and Vasilieva, Tamara Pavlovna. Heat treated and aged magnesium-base alloy. 4,116,731, Cl. 148-161.000.

Timblin, Stanley W. Alarm system for vending machines. 4,117,465, Cl. 340-545.000.

Timex Corporation: *See—*
Leibowitz, Marshall, 4,116,546, Cl. 350-356.000.
Wiesner, Leo, 4,117,421, Cl. 331-116.00R.

Tinholt, Thomas H.: *See—*
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Tiszai Vegy Kombinat: *See—*
Huszar, Andor; Szekely, Geza; Rusznak, Istan; Trezl, Lajos; Bertalan, Gyorgy; Zaoui nee Serfozo, Ilona; and Molnar, Imre, 4,116,897, Cl. 260-17.40R.

TMC Corporation: *See—*
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Tobiki, Hisao: *See—*
Yamada, Hirotada; Okamura, Kosaku; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,117,126, Cl. 424-246.000.

Tobin, William James: *See—*
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Todeschini, Eugenio; and Riganti, Gian Piero, to Massey-Ferguson Services N.V. Hydrostatic transmissions. 4,116,292, Cl. 180-6.480.

Toft, Kaj, to General Electric Company. Plastic steam iron. 4,115,935, Cl. 38-88.000.

Toizume, Tetsuo: *See—*
Hayashi, Tadayoshi; Takagi, Yoshiaki; Toizume, Tetsuo; and Umeda, Masakazu, 4,116,884, Cl. 252-470.000.

Tojyo, Tsutomu; and Sato, Shozo, to Olympus Optical Co., Ltd. Method for the manufacture of optical mold for reproducing curved surfaces having the same shape as an optical prototype. 4,116,753, Cl. 156-629.000.

Tokico Ltd.: *See—*
Hayashida, Yoshihiro, 4,116,493, Cl. 303-24.00A.

Tokiwa, Taisuke: *See—*
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Tokuda, Hirokuni: *See—*
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Tokyo Shibaura Electric Co.: *See—*
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Tokyo Shibaura Electric Co., Ltd.: *See—*
Komeya, Katsutoshi; Inoue, Hiroshi; and Ohta, Takao, 4,117,095, Cl. 423-344.000.
Kusakabe, Hiromi, 4,117,407, Cl. 325-455.000.

Matsuo, Satoshi, 4,116,231, Cl. 128-2.10Z.
Miyake, Kazuhiko; and Yamada, Bunkichi, 4,117,512, Cl. 358-183.000.
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Tominaga, Yoichiro: *See*—
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Tomita, Kazuo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Apparatus for treating evaporated fuel gas. 4,116,184, Cl. 123-136.000.
Tomlinson, Ernest Valdur; and Carne, Charles Nicholas, to Carson (Instruments & Equipment) Limited. Digital measuring instruments. 4,117,320, Cl. 250-237.00G.
Tomlinson, James N. Dial illumination means. 4,115,994, Cl. 58-50.00R.
Toms, Ed P., to Water-Cyk Corporation, The. Water recirculation system. 4,115,879, Cl. 4-318.000.
Tong, Duncan, to Playart Ltd. Electrical connection device for a toy vehicle track. 4,116,381, Cl. 238-10.00E.
Tonne, Peter: *See*—
Dimroth, Peter; Junge, Helmut; Tonne, Peter; and Urtel, Rolf, 4,116,953, Cl. 260-157.000.
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Tonouchi, Takeo; Tonouchi, Akio; Shiroshima, Makoto; Chimura, Yuichi; and Ohkubo, Kazuyoshi, to Nagano-Ken Kohridofu Kogyo Cooperative Association. Method for producing tofu-like food. 4,117,174, Cl. 426-634.000.
Topel, Kenneth D., to Fine-Line, Inc. Peep sight for archery bow. 4,116,194, Cl. 124-87.000.
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Toray Silicone Company, Ltd.: *See*—
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Torelli, Aldo; and Prinz, Erwin, to Fahrni, Peter. Apparatus to coat a flowing mass of particulate material. 4,116,163, Cl. 118-303.000.
Toriyama, Haruhiko: *See*—
Sato, Kazuo; Toriyama, Haruhiko; and Matsushige, Seiichi, 4,117,451, Cl. 340-52.00A.
Torrez, Kay Anne. Floor-supported cushion assembly and method of making same. 4,116,148, Cl. 112-262.000.
Toshiba Kikai Kabushiki Kaisha: *See*—
Kawakami, Hideo; and Ebata, Hitoshi, 4,116,101, Cl. 83-747.000.
Manabe, Takao, 4,116,143, Cl. 112-121.110.
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Toth, Bela: *See*—
Somkaite, Rozalija; and Toth, Bela, 4,116,824, Cl. 209-262.000.
Towns, Edward Johnson; and Brown, Edward Morris, to Downing, Neil Hugh. Metering device and method. 4,116,371, Cl. 222-455.000.
Toyo Kogyo Co. Ltd.: *See*—
Kikura, Katsuaki; Nomura, Hiroshi; and Takeda, Kiyohiro, 4,116,190, Cl. 123-202.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
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Nomura, Kenichiro; Mori, Mamoru; Yasumatsu, Jun; Kubota, Tatsushi; Hachisuka, Sadao; and Tatematsu, Kazuhisa, 4,116,402, Cl. 242-107.100.
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Transco Energy Company: *See*—
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Trehu, Yves Michel, to Du Pont de Nemours, E. I., and Company. Low attenuation, high strength optical fiber with silica filament core. 4,116,654, Cl. 65-3.00C.
Trezl, Lajos: *See*—
Huszar, Andor; Szekely, Geza; Rusznak, Istan; Trezl, Lajos; Bertalan, Gyorgy; Zaoui nee Serfozo, Ilona; and Molnar, Imre, 4,116,897, Cl. 260-17.40R.
Tri-Venture: *See*—
Bates, James T., 4,117,526, Cl. 361-92.000.
Trinel, Pierre-Andre; Leclerc, Henri; and Moschetto, Yves. Method for microbiological analysis of liquid mediums. 4,116,631, Cl. 23-230.00B.
Trio Kabushiki Kaisha: *See*—
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Troster, Helmut: *See*—
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Troth, Paul H., to McNeil Corporation. Hangers for overhead suspended track. 4,116,134, Cl. 104-111.000.
Trozzi, Norman Kenneth, to Foster Wheeler Energy Corporation. Burner nozzle. 4,116,388, Cl. 239-406.000.
Tru-Fit Products Corporation: *See*—
Raycher, Robert J., 4,117,298, Cl. 219-98.000.
Trudell, Richard W., to McDonnell Douglas Corporation. Exhaust muffler. 4,116,303, Cl. 181-252.000.
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TRW Inc.: *See*—
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Tsirkin, Mark Zakharovich; Kogan, Viktor Ovshievich; Polyakov, Rudolf Semenovich; Presnov, Jury Leonidovich; and Khanukova, Elina Sergeevna. Ripple-shaped tightening strip for retaining electric machine winding. 4,117,362, Cl. 310-214.000.
Tsuchida, Nobuo: *See*—
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Tsuchiya, Mikio; Kawamura, Takashi; and Shibata, Kaoru, to Honshu Seishi Kabushiki Kaisha. Antistatic, low temperature heat sealable polypropylene composite film and process for production thereof. 4,117,193, Cl. 428-339.000.
Tsukui, Norihiko: *See*—
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Tsunoo, Masahiko; Hirose, Namio; Kimura, Takeji; Inoue, Michihiro; and Sato, Masaharu, to Matsushita Electric Industrial Co., Ltd. Integrated circuit for an electronic musical instrument. 4,116,102, Cl. 84-1.220.
Tsuruta, Hideki: *See*—
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Tsuruta, Masao: *See*—
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Tuthill, Lyle Brown: *See*—
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Uchida, Norimasa; Kiyonaga, Kingo; and Nakamura, Hideki, to Hitachi Metals, Ltd. High speed tool steel having high toughness. 4,116,684, Cl. 75-126.00C.
Uchida, Tomio, to Caterpillar Mitsubishi Ltd. Quick coupler. 4,116,346, Cl. 214-145.00A.
Uchida, Tomio, to Caterpillar Mitsubishi Ltd. Quick coupler. 4,116,347, Cl. 214-145.00A.
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Uhlig, Albert R., to Owens-Illinois, Inc. Apparatus for forming a blown plastic container. 4,116,608, Cl. 425-525.000.

Uhlig, Albert R., to Owens-Illinois, Inc. Method for making a plastic container adapted to be grasped by steel drum chime-handling devices. 4,117,062, Cl. 264-94.000.

Uhlig, Gerhardt E. Safety closure container. 4,116,351, Cl. 215-216.000.

Ukihashi, Hiroshi; Asawa, Tatsuro; Yamabe, Masaaki; and Miyake, Haruhisa, to Asahi Glass Company Ltd. Process for producing fluorinated copolymer having ion-exchange groups. 4,116,888, Cl. 521-31.000.

Ullman, Myron E., Jr., to Kessler Products Company. Drawer construction. 4,116,513, Cl. 312-330.00R.

Umea Mekaniska AB: *See—*
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Union Oil Company of California: *See—*
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United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the: *See—*
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Arnold, James J., deceased; and Campbell, Donn V., 4,117,492, Cl. 343-747.000.
Howell, Thomas H., 4,116,404, Cl. 244-3.230.
Nieberlein, Vernon A., 4,116,634, Cl. 23-230.00R.
Sharp, Chester E., 4,117,486, Cl. 343-18.00B.
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Fisher, Frederick H.; and Anderson, Victor C., 4,116,153, Cl. 114-244.000.
Gould, Paul F.; and Pate, James O., 4,117,447, Cl. 340-4.00E.
Griffith, James R.; and O'Rear, Jacques G., 4,116,945, Cl. 528-362.000.
Kaloi, Cyril M., 4,117,489, Cl. 343-700.0MS.
Kruer, Melvin R.; Esterowitz, Leon; Bartoli, Filbert J.; and Allen, Roger E., 4,117,329, Cl. 250-338.000.
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U.S. Philips Corporation: *See—*
Appelquist, Jan Olov; and Lindwall, Conny Holger, 4,117,294, Cl. 219-10.55C.
Armstrong, Desmond R., 4,117,384, Cl. 318-326.000.
Auphan, Michel Joseph, 4,117,328, Cl. 250-330.000.
Bijma, Jan, 4,117,379, Cl. 315-370.000.
Carasso, Marino Giuseppe; van de Polder, Leendert Johan; and Tan, Sing Liong, 4,117,515, Cl. 358-217.000.
Clarke, John A., 4,116,528, Cl. 350-52.000.
de Bie, Jan Rudolf; Ekkelboom, Tjepke Hendrik; Geytenbeek, Johannes Jacobus Franciscus; van Hoorn, Willem Lodewijk; and Schob, Otmar, 4,117,367, Cl. 313-352.000.
de Boer, Eeltje, 4,117,509, Cl. 358-4.000.
DeConinck, Wilfried Rene'; and Goret, Jean Louis Ernest Raymond, 4,117,420, Cl. 331-17.000.
De Jong, Herman Lambertus, 4,116,795, Cl. 204-195.00S.
Jacobs, Cornelis Adrianus Johannes; Driessen, Antonius Jozephus Gerardus Cornelis; and Cornelissen, Gerardus Antonius Petrus Maria, 4,117,370, Cl. 315-35.000.
Janssen, Daniel Johannes Gerardus, 4,117,391, Cl. 323-4.000.
Kuus, Gijsbert; and de Ridder, Adriaan Jan, 4,117,369, Cl. 313-178.000.
Ponjee, Johannes Jacobus; and Bruinink, Jacob, 4,116,535, Cl. 350-355.000.
van den Elzen, Hendricus Christianus; van Gerwen, Petrus Josephus; and Snijders, Wilfred Andre Maria, 4,117,277, Cl. 179-170.600.
van Kampen, Hans, 4,117,269, Cl. 179-15.0BW.
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Murray, John A., 4,117,059, Cl. 264-82.000.
Murray, John A., 4,117,060, Cl. 264-82.000.

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Gell, Maurice L.; and Duhl, David N., 4,116,723, Cl. 148-3.000.
Johnson, Bruce Virgil, 4,116,383, Cl. 239-8.000.
Licht, Lazar, 4,116,503, Cl. 308-9.000.
Martin, Anthony Newman; Buczek, Carl James; and Mongeon, Robert Joseph, 4,116,000, Cl. 60-242.000.
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University of Glasgow: *See—*
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Bliss, Robert L., 4,115,975, Cl. 52-646.000.

Unkelbach, Karl-Heinz; and Duren, Gottfried, to Klockner-Humboldt-Deutz Aktiengesellschaft. High intensity magnetic separator for wet separation of magnetizable particles of solids. 4,116,839, Cl. 210-222.000.

Upjohn Company, The: *See—*
Biermacher John J., 4,116,837, Cl. 210-198.00C.
Marshall, Vincent P.; Elrod, David W.; Koert, James M.; Reisender, Elizabeth A.; and Wiley, Paul F., 4,116,769, Cl. 195-51.00R.
Morton, Douglas Ross, Jr., 4,117,005, Cl. 562-503.000.
Nelson, Norman A., 4,116,988, Cl. 260-413.000.
Nelson, Norman A., 4,116,989, Cl. 260-413.000.
Salmond, William G., 4,116,985, Cl. 260-397.200.
Sanson, Joseph; and Moser, Kurt, 4,116,736, Cl. 156-79.000.
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USM Corporation: *See—*
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Bessonov, Andrei Stefanovich; Uspensky, Alexandr Vitalievich; and Shekhovtsov, Nikolai Vasilievich, 4,116,636, Cl. 422-101.000.

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Valyi, Emery I. Apparatus for the preparation of hollow plastic articles. 4,116,606, Cl. 425-526.000.
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Stargell, Donald E., 4,116,361, Cl. 220-273.000.
VanBuskirk, Warren T.; and Tates, Donald W., to Xerox Corporation. Sorting apparatus and reproducing machine. 4,116,429, Cl. 271-173.000.
Vandenberg, Ervin K., to Westran Corporation. Landing gear actuator. 4,116,315, Cl. 192-48.920.
van den Elzen, Hendricus Christianus; van Gerwen, Petrus Josephus; and Snijders, Wilfred Andre Maria, to U.S. Philips Corporation. Arrangement for simultaneous two-way data transmission over two-wire circuits. 4,117,277, Cl. 179-170.600.
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van Kampen, Hans, to U.S. Philips Corporation. Time division multiplex telecommunication exchange. 4,117,269, Cl. 179-15.0BW.
Van Latenstein, Anthonie: *See—*
Radstake, Herman; Hasenack, Nicolas A.; Van Latenstein, Anthonie; and Burger, Jacobus J., 4,116,681, Cl. 75-41.000.
Vannice, M. Albert; and Garten, Robert L., to Exxon Research & Engineering Co. Hydrocarbon synthesis from CO and H_2 using Rh supported on titanium oxides. 4,116,994, Cl. 260-449.00R.
Van Tijn, Roeland, to Hollandse Signaalapparaten B.V. Method of making textured continuous filament yarn. 4,115,992, Cl. 57-164.000.
Van Vechten, James Alden: *See—*
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Van Vliet, Johannes Adrianus Josephus Maria; and Broerse, Pieter Hendrik, to U.S. Philips Corporation. Electric device provided with a metal vapor discharge lamp. 4,117,371, Cl. 315-46.000.
Vapor Corporation: *See—*
Reip, Raymond G., 4,116,062, Cl. 73-321.000.
Varga, I. Steven. Sawtooth composite girder. 4,115,971, Cl. 52-334.000.
Varga, Theodore; Devine, Arthur, Jr.; and Meikle, Warren, to Meikle & Devine, Inc. Engine repair stand. 4,116,424, Cl. 269-55.000.
Varian Associates, Inc.: *See—*
Felton, John Robert; and Gutow, Russell S., Jr., 4,117,332, Cl. 250-374.000.
Varian MAT Gesellschaft mit beschrankter Haftung: *See—*
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Varlonga, Giovanni. Fixed and movable frame fixtures for doors and windows. 4,115,972, Cl. 52-398.000.
Varma, Ravi K.: *See—*
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Varner, George Clifford, to Milliken Research Corporation. Printing of pattern designs with computer controlled pattern dyeing device. 4,116,626, Cl. 8-149.000.
Varta Batterie Aktiengesellschaft: *See—*
Schuster, Heinz; and Prange, Rolf, 4,117,211, Cl. 429-121.000.
Vasilantone, Michael. Solar energy unit. 4,116,223, Cl. 126-271.000.
Vasilieva, Tamara Pavlovna: *See—*
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Vasquez, Tulio. Sound alarm for protecting briefcases and the like. 4,117,468, Cl. 340-571.000.
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Forster, Karl-Heinz; and Lein, Werner, 4,116,125, Cl. 101-212.000.
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Heldmann, Ernest J.; and Capuano, Terry D., 4,116,572, Cl. 403-7.000.
Velsicol Chemical Company: *See—*
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Wu, Chin Ching; and Krenzer, John, 4,116,969, Cl. 260-306.80R.
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Venero, Agustin F.: *See—*
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Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft: *See—*
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Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft: *See—*
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Verlander, Michael S.: *See—*
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Verma, Monica Harish, to Du Pont de Nemours, E. I., and Company. Water based alkyd resin primer. 4,116,904, Cl. 260-22.00R.
Vettiger, Alfons, to Ruti Machinery Works Ltd. Jet loom. 4,116,243, Cl. 139-435.000.
Vickers Limited: *See—*
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Vidal, Frederick D.; and Gerrity, Albert B., to Pennwalt Corporation. Free-flowing fungal enzyme composition. 4,116,772, Cl. 195-64.000.
Vidal, Henri. Stabilized earth structures. 4,116,010, Cl. 405-262.000.
Vincent, Richard T. Calculator for laying out parking lots. 4,117,313, Cl. 235-61.0GM.
Vinogradova, Svetlana Vasilievna: *See—*
Korshak, Vasily Vladimirovich; Vinogradova, Svetlana Vasilievna; Storozhuk, Ivan Pavlovich; Valetsky, Petr Maximilianovich; Sokolov, Lev Borisovich; Mikitaev, Abdulakh Kazbulatovich; Askadsky, Andrei Alexandrovich; Kochergin, Jury Sergeevich; Slonimsky, Grigory Lvovich; Shirokova, Larisa Borisovna; Nebosenko, Ljudmila Fedorovna; and Zhuravlev, Nikolai Danilovich, 4,116,940, Cl. 528-173.000.
Vinson, Mark Alexander, to Burroughs Corporation. Method of making a V-MOS field effect transistor for a dynamic memory cell having improved capacitance. 4,116,720, Cl. 148-1.500.
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Vogel, Ralph A.; and Kittsmiller, Robert K., to Essex Group, Inc. Wire annealing apparatus. 4,116,422, Cl. 266-104.000.
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von Strandtmann, Max; Cohen, Marvin P.; Klutchko, Sylvester; and Shavel, John, Jr., to Warner-Lambert Company. 3-(1H-Tetrazol-5-yl)chromones. 4,116,971, Cl. 260-308.00D.
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Yakovlevna; Yanina, Anna Dmitrievna; and Komarova, Nadezhda Andreevna, 4,117,139, Cl. 424-267.000.
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Vukmirovich, Daniel. Flexible discus device. 4,115,946, Cl. 46-74.00D.
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Wahoski, Ernest C., to United States of America, Army. Connector, reducer/adapter, flare to flareless. 4,116,477, Cl. 285-169.000.
Walden, Gerald M., to Caterpillar Tractor Co. Resilient mounting for an operator's station on a vehicle. 4,116,412, Cl. 248-358.00R.
Waldron, David W., to Lowndes Engineering Co., Inc. Fog generator. 4,116,385, Cl. 239-77.000.
Walker, Francis H.; and Baker, Don R., to Stauffer Chemical Company. N-alkyl-alpha-(substituted phenoxy) alkylamides and their use as herbicides. 4,116,677, Cl. 71-118.000.
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Wall, Frederick. Liquid level sensing device and swimming pool water circulation systems containing the same. 4,115,877, Cl. 4-172.170.
Wallace, Edwin G., to Stauffer Chemical Company. Substituted carbamic anhydrides. 4,117,153, Cl. 424-286.000.
Wallis, Marvin E. Modular engine assembly. 4,116,006, Cl. 60-709.000.
Walther, William D., to Dayton-Walther Corporation. Lock ring flanged tire carrying rim and wheel. 4,116,489, Cl. 301-12.00R.
Walworth, Kirk Sumner; and Martin, Anthony Newman, to United Technologies Corporation. Sensing device. 4,117,460, Cl. 340-190.000.
Walworth, Ralph Franklin. Multi-speed hydraulic drive torque converter. 4,116,003, Cl. 60-487.000.
Walz, Alfred. Gas discharge lamp with double-electrode powered through a rectifier, and discharge-tight cross-connection of the electrode chambers, and a process for its manufacture. 4,117,372, Cl. 315-71.000.
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Ward, Edward B. Liner for concrete forms. 4,116,415, Cl. 249-35.000.
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Abe, Nobuyuki; Watanabe, Osamu; Nunokawa, Koji; Tanaka, Ichiro; and Manabe, Masao, 4,116,012, Cl. 405-238.000.
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Watarai, Etsuyoshi: *See*—
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Water-Cyk Corporation, The: *See*—
Toms, Ed P., 4,115,879, Cl. 4-318.000.
Watsky, Benjamin. Snatch proof handle for pocketbooks, handbags and the like. 4,116,253, Cl. 150-33.000.
Watson, David: *See*—
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Takahashi, Yuzo; Wazima, Yoshimi; Nakada, Akira; Tanaka, Yasuyuki; Nagai, Katsumi; Takahashi, Nobuo; Matsuda, Hiroshi; Aizawa, Eizi; and Oyama, Shiro, 4,117,188, Cl. 428-36.000.
Webb, Clyde B., to Carpco, Inc. Method of selectively separating glass from waste material. 4,116,822, Cl. 209-11.000.
Webb, Jimmy L., to General Electric Company. Method for making aromatic bis (ether phthalic acid) or aromatic bis (ether anhydride)s. 4,116,980, Cl. 260-346.300.
Webb, Jimmy L.: *See*—
Cleveland, William K. S.; Webb, Jimmy L.; and Orlando, Charles M., 4,117,018, Cl. 568-726.000.
Wehde, Heinz, to Teldix GmbH. Bearing and drive structure for spinning turbine. 4,117,359, Cl. 310-67.00R.
Wehinger, Egbert: *See*—
Moller, Eike; Meng, Karl-August, deceased; Wehinger, Egbert; Horstmann, Harald; and Seuter, Friedel, 4,117,143, Cl. 424-273.00P.
Moller, Eike; Meng, Karl-August, deceased; Wehinger, Egbert; Horstmann, Harald; and Seuter, Friedel, 4,117,145, Cl. 424-273.00P.
Weible, Warren W., to Zeller Corporation, The. Universal joint. 4,116,018, Cl. 64-12.000.
Weichselbaum, Edwin Gordon, to Sherwood Medical Industries Inc. Package for sterile article. 4,116,338, Cl. 206-610.000.
Weinar, Roger Neil, to Ceiling Resurfacing Systems, Inc. Grid ceiling trim intersection cap. 4,115,970, Cl. 52-311.000.
Weinberg, Kurt; and Johnson, Gordon Carlton, to Union Carbide Corporation. Process for catalytic production of polyesters. 4,116,942, Cl. 528-283.000.
Weisang, Joseph Edouard; and Engelhard, Philippe, to Compagnie Francaise de Raffinage. Catalysts for the hydrotreatment of hydrocarbons and processes for the utilization of said catalysts. 4,116,870, Cl. 252-439.000.
Weisenborn, Frank Lee: *See*—
Ondetti, Miguel Angel; and Weisenborn, Frank Lee, 4,116,962, Cl. 260-293.630.
Weiss, Daniel. Parabolic reflector with vary transverse width. 4,116,541, Cl. 350-296.000.
Welschof, Hans-Heinrich, to Lohr & Bromkamp GmbH. Bearing element seal for a universal joint. 4,116,019, Cl. 64-17.00A.
Wengeler, Wilhelm; and Hoffmann, Egbert, to Uhde GmbH. Process for reducing the grain size of phosphate rock. 4,116,390, Cl. 241-24.000.
Weseloh, William E.: *See*—
Orshansky, Elias, Jr. deceased; and Weseloh, William E., 4,116,089, Cl. 74-687.000.
West County Supply & Mfg. Co., Inc.: *See*—
Bishop, Robert L., 4,115,961, Cl. 52-58.000.
Westerhoven, Henry. Planter for trees, herbs, shrubs and similar plants. 4,116,137, Cl. 111-2.000.

Western Electric Company, Inc.: *See*—
Chu, Tze Yao; Jaluria, Yogesh; Lavigna, Robert Joseph; Reusser, Raymond Edward; and Williams, George, 4,116,642, Cl. 422-249.000.
Hudson, James Alphus, Jr.; Levandoski, Raymond Alexander; and Long, Allen Kyle, 4,117,398, Cl. 324-61.00R.
Western Geophysical Company of America: *See*—
Johnston, Otis A., 4,116,294, Cl. 180-44.00F.
Martin, Dallas James, 4,116,299, Cl. 181-113.000.
Siems, Lee E., 4,117,448, Cl. 340-15.5TS.
Westinghouse Air Brake Company: *See*—
Hyler, John H., 4,116,298, Cl. 180-139.000.
Stark, Donald E.; Ehrlich, Anthony G.; and Guillaumin, Bruno, 4,117,529, Cl. 361-182.000.
Westinghouse Brake & Signal Co. Ltd.: *See*—
Norton, David John, 4,117,463, Cl. 340-652.000.
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Nolte, David G., 4,116,076, Cl. 73-299.000.
Westinghouse Electric Corp.: *See*—
Berkey, Edgar; Reed, William H., III; and Hickam, William M., 4,117,396, Cl. 324-33.000.
Bolin, Philip C., 4,117,528, Cl. 361-120.000.
Flick, Carl, 4,117,358, Cl. 310-59.000.
Gorman, Joseph G.; Roach, James F.; and Wayland, Paul O., 4,117,288, Cl. 200-144.00R.
John, Clarence D., Jr., 4,116,767, Cl. 176-87.000.
John, Clarence D., Jr., 4,117,333, Cl. 250-380.000.
Kwiecinski, James R., 4,117,032, Cl. 260-857.0PE.
Petro, John; and Schofield, Charles R., 4,117,299, Cl. 219-117.100.
Smith, James D. B.; and Kauffman, Robert N., 4,117,361, Cl. 310-208.000.
Wilsdon, Thomas A.; Heim, William P.; and Barlis, Glenn A., 4,117,440, Cl. 337-213.000.
Zitelli, William E.; and Szabo, Andras I., 4,117,477, Cl. 340-347.0NT.
Westran Corporation: *See*—
Vandenberg, Ervin K., 4,116,315, Cl. 192-48.920.
Westvaco Corporation: *See*—
Kurrle, Frederick L., 4,117,191, Cl. 428-330.000.
Wexell, Dale R.: *See*—
Stempin, John L.; and Wexell, Dale R., 4,116,703, Cl. 106-75.000.
Whatley, Norman, Jr. Pre-volatilizing electronically controlled carburetor. 4,116,177, Cl. 123-119.00R.
Whatman Reeve Angel Limited: *See*—
Head, Brian Arthur, 4,116,761, Cl. 162-152.000.
Wheeler, Charles Joseph, to Ashtabula Development Co. Device for stripping insulation from a wire. 4,116,092, Cl. 81-9.50R.
White, Frederic H., III, to Rockwell International Corporation. Alignment system for lasers. 4,117,319, Cl. 250-201.000.
White, Ira Thomas. Guy strain insulators. 4,115,965, Cl. 52-148.000.
Whitney, Thomas A.; and Klemann, Lawrence P., to Exxon Research & Engineering Co. Alkali metal salts of complex anions containing heteroatom substituents and electrolyte compositions containing these. 4,117,213, Cl. 429-194.000.
Whittle, William C.; and Zneimer, Joel E., to Bell & Howell Company. Isthmian precision adjustable mount for magnet head assembly. 4,117,522, Cl. 360-109.000.
Wicker, Helmut; Kielhorn, Werner; and Heyduk, Gerhard, to BBC Brown, Boveri & Company Limited. Method for conveying a row of forging ingots through an inductive heating apparatus. 4,117,293, Cl. 219-10.410.
Wiegner, Joseph R.: *See*—
Charles, Ronald A.; Jones, Paul W.; Staples, John L.; and Wiegner, Joseph R., 4,116,775, Cl. 195-103.50M.
Wiesner, Leo, to Timex Corporation. Crystal oscillator with reduced power consumption. 4,117,421, Cl. 331-116.00R.
Wilcox, Merrill. N-benzyl-2,6-dinitro-3-amino-4-trifluoromethylanilines as plant growth regulants. 4,116,667, Cl. 71-78.000.
Wildmoser, Alfred: *See*—
Stockner, Josef; and Wildmoser, Alfred, 4,117,048, Cl. 261-93.000.
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Wilhelm Hegenscheidt Gesellschaft mbH: *See*—
Dombrowski, Theodor; and Wittkopp, Helmut, 4,116,094, Cl. 82-8.000.
Wilkenloh, Frederic Nash, to Comul Scope Company. Coaxial drop wire. 4,117,260, Cl. 174-106.00R.
Willard, John Wesley, Sr., to CAW Industries, Inc. Method of treating seed. 4,116,666, Cl. 71-77.000.
William H. Rorer, Inc.: *See*—
Buehler, John D.; Shah, Pravinchandra B.; and Joslin, Robert S., 4,117,116, Cl. 424-157.000.
Diamond, Julius; and Zalipsky, Jerome J., 4,117,165, Cl. 424-322.000.
Williams, Carl W.: *See*—
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Williams, Harrison L., to Preformed Line Products Company. Dead end appliance for linear bodies and drop wire type conductor installation including the same. 4,117,256, Cl. 174-40.00R.
Williams, James E.: *See*—
Jepsky, Joseph; Englander, Irvin S.; and Williams, James E., 4,117,482, Cl. 343-7.300.
Williams, Joel L.: *See*—
Dudley, Betty J.; and Williams, Joel L., 4,116,898, Cl. 260-17.40R.
Williams, John E.: *See*—
Outten, Edward Francis; Ryer, Jack; and Williams, John E., 4,116,877, Cl. 252-72.000.
Williams, L. G.: *See*—
Taylor, Paul G.; Son, Chung H.; Hom, Martha C.; Williams, L. G.; and Steel, Ronald E., 4,117,176, Cl. 426-660.000.
Williams, Richard Jean: *See*—
Ganssle, Eugene Robert; Scott, Ralph Richard; and Williams, Richard Jean, 4,116,263, Cl. 165-27.000.
Williams, Richard W. Recorder actuator for communication lines. 4,117,266, Cl. 179-6.00R.
Willig, Carl Joseph: *See*—
Temple, Robert Dwight; Bryan, William Thomas; and Willig, Carl Joseph, 4,116,854, Cl. 252-167.000.
Willis, Chester Rhodes: *See*—
Chakrin, Lawrence William; Snader, Kenneth Means; and Willis, Chester Rhodes, 4,117,226, Cl. 542-438.000.
Willis Oil Tool Co.: *See*—
Muchow, John D., 4,116,215, Cl. 137-596.180.
Wills, Robert N. Cleaning apparatus. 4,115,891, Cl. 15-71.000.
Willyoung, David M., to General Electric Company. Combined cycle power plant with atmospheric fluidized bed combustor. 4,116,005, Cl. 60-655.000.
Wilsdon, Thomas A.; Heim, William P.; and Barlis, Glenn A., to Westinghouse Electric Corp. Fuse mount for switching apparatus. 4,117,440, Cl. 337-213.000.
Wilson Greatbatch Ltd.: *See*—
Mead, Ralph T.; Rudolph, Frank W.; Frenz, Norbert W., Jr.; and Greatbatch, Wilson, 4,117,212, Cl. 429-153.000.
Wilson, William George Moore; and Stewart, Douglas Edward, to Marconi Company Limited, The. Image translation devices. 4,117,331, Cl. 250-334.000.
Winans, Esther D.: *See*—
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Ryer, Jack; Brois, Stanley J.; and Winans, Esther D., 4,116,643, Cl. 44-63.000.
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Winchester, Roy E.; Marjoran, Michael J.; and O'Brien, Roger, to De La Rue Crosfield Limited. Stacking apparatus for flexible sheets. 4,116,430, Cl. 271-177.000.
Windisch, Lawrence; Nees, John; and Channing, Harry M., to General Battery Corporation. Cascading-water, lead-acid storage battery neutralization forming and charging method. 4,117,387, Cl. 320-2.000.
Windmoller & Holscher: *See*—
Langemeyer, Carl; and Tetenborg, Konrad, 4,115,978, Cl. 53-570.000.
Winfree, John W., Jr. Billiards cue holder. 4,116,342, Cl. 211-68.000.
Winner Food Products Limited: *See*—
Wong, Harry Hon Hai, 4,116,118, Cl. 99-423.000.
Wippler, Constant, to Essilor International (Compagnie Generale d'Optique). New photochromic materials and method for their preparation. 4,116,862, Cl. 252-300.000.
Wise, Charles Richard, Jr.: *See*—
Woolley, Harold Oakley, Jr.; and Wise, Charles Richard, Jr., 4,115,919, Cl. 29-740.000.
Wise, David S.: *See*—
Dragani, James J.; and Wise, David S., 4,116,560, Cl. 355-41.000.
Wiser, John A. Drawer latching device. 4,116,512, Cl. 312-330.00R.
Witberg, Martinus Johannes Joseph, to Sandvik Aktiebolag. Device for fastening cutting dies on a base plate. 4,116,100, Cl. 83-698.000.
Witco Chemical Corporation: *See*—
Longley, Kermit D.; and Karalis, Anastasios J., 4,117,237, Cl. 560-151.000.
Witenhafer, Donald Edward; and Popovich, David Thomas, to B. F. Goodrich Company, The. Inversion polymerization process for producing vinyl resins. 4,117,215, Cl. 526-62.000.
Witenhafer, Donald Edward; and Popovich, David Thomas, to B. F. Goodrich Company, The. Inversion polymerization process for producing vinyl resins. 4,117,216, Cl. 526-62.000.
Witting, Harald L., to General Electric Company. Fluorescent lamp with opposing inversere cone electrodes. 4,117,374, Cl. 315-99.000.
Wittkopp, Helmut: *See*—
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Deb, Satyendra K.; Chen, Schoen-nan; Witzke, Horst; Russak, Michael A.; and Reichman, Joseph, 4,117,210, Cl. 429-111.000.
Wochnowski, Waldemar, to Hauni-Werke Korber & Co. KG. Method and apparatus for blending tobacco. 4,116,203, Cl. 131-138.000.
Wodzinski, Dale M.; and Clissa, Michael, to Chemetron Corporation. Short circuiting arc control station for multiple operator welding system. 4,117,304, Cl. 219-130.100.
Wolf, Franz-Josef. Pipe coupling. 4,116,474, Cl. 285-110.000.
Wolfe, John Edmond, to Burroughs Corporation. Double deflection electron beam generator for employment in the fabrication of semiconductor and other devices. 4,117,339, Cl. 250-492.00A.
Wolpert, Stanley, to Loomskill, Inc. Display frame. 4,115,937, Cl. 35-55.000.

Wolter, Bernd: *See*—
Gosger, Peter; Pott, Paul Gerhard; and Wolter, Bernd, 4,116,799, Cl. 204-224.00M.

Wolter, Heinz, to DOM-Sicherheitstechnik GmbH & Co. KG. Reversible flat key for cylinder locks. 4,116,025, Cl. 70-358.000.

Wong, Harry Hon Hai, to Winner Food Products Limited. Apparatus for preparing pastry. 4,116,118, Cl. 99-423.000.

Wooding Corporation: *See*—
Wooding, Patrick J., 4,117,253, Cl. 13-31.00R.

Wooding, Patrick J., to Wooding Corporation. High integrity atmosphere control of electroslag melting. 4,117,253, Cl. 13-31.00R.

Woodward, Walter Ray: *See*—
Mansfield, Donald Longworth; and Woodward, Walter Ray, 4,117,356, Cl. 310-49.00R.

Woolley, Harold Oakley, Jr.; and Wise, Charles Richard, Jr., to AMP Incorporated. Machine for press fit insertion of chip devices. 4,115,919, Cl. 29-740.000.

Worman, Charles H., Jr., to Air Products and Chemicals, Inc. Removal of vinyl chloride from PVC resins using microwvave radiation. 4,117,220, Cl. 528-503.000.

Worrel, Calvin J.: *See*—
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Budris, Allan R., 4,116,583, Cl. 415-199.100.

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Wronski, Christopher Roman: *See*—
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Wu, Chin Ching; and Krenzer, John, to Velsicol Chemical Company. 1-Thiazolyl-5-hydroxyimidazolidinones. 4,116,969, Cl. 260-306.80R.

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Thoma, Wilhelm; Wulff, Jochen; and Niederdellmann, Georg, 4,116,741, Cl. 156-239.000.

Wunsch, Erich, to Max Planck-Gesellschaft zur Forderung der Wissenschaften. Tridecapetide having gastrin effect. 4,117,117, Cl. 424-177.000.

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Wycklendt, Daniel A., to Electric Power Research Institute, Inc. Current limiting fuse construction and method. 4,117,441, Cl. 337-295.000.

Xerox Corporation: *See*—
Adamek, John A.; and Ziehm, Richard T., 4,116,558, Cl. 355-24.000.
Lentz, James A.; and Safford, George J., 4,116,894, Cl. 521-94.000.
Prest, William M., Jr, 4,117,072, Cl. 264-288.000.
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,116,431, Cl. 271-236.000.
Stolka, Milan; Pearson, James M.; and Yanus, John F., 4,117,239, Cl. 560-221.000.
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Young, Eugene F.; Ray, Curtis M.; and Rogers, Ryland F., 4,116,555, Cl. 355-15.000.

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Yabe, Akira; and Honda, Koichi, to Agency of Industrial Science & Technology. Photographic method utilizing a photosensitive composition containing a 2-azidobiphenyl and a triplet sensitizer. 4,116,692, Cl. 96-27.00E.

Yabe, Yuichiro: *See*—
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Yajima, Seishi; Hayashi, Josaburo; and Omori, Mamoru, to Research Institute for Iron, Steel and Other Metals of the Tohoku University, The. Silicon carbide sintered moldings and a method for producing the same. 4,117,057, Cl. 264-63.000.

Yakhontov, Leonid Nikolaevich: *See*—
Mashkovsky, Mikhail Davydovich; Yakhontov, Leonid Nikolaevich; Ado, Andrei Dmitrievich; Kaminka, Mikhail Emmanuilovich; Mikhlina, Eva Evseevna; Vorobieva, Valentina Yakovlevna; Yanina, Anna Dmitrievna; and Komarova, Nadezhda Andreevna, 4,117,139, Cl. 424-267.000.

Yamabe, Masaaki; Arai, Kiyotaka; Samejima, Shunichi; and Noshiro, Makoto, to Asahi Glass Company Ltd. Process for producing oxygen-containing cyclic fluoro compound. 4,116,977, Cl. 260-343.600.

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Yamaguchi, Takeyoshi. Wide-angle spyglass. 4,116,529, Cl. 350-69.000.

Yamaji, Tadao; Nakajima, Toshi; and Sagara, Takao, to Kubota, Ltd. Separation-preventive pipe joint. 4,116,478, Cl. 285-302.000.

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Yamamoto, Kazuhide, to Daido-Maruta Finishing Co., Ltd. Process for modifying fibrous products containing cellulosic fibers. 4,116,625, Cl. 8-120.000.

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Yamamoto, Yoshun: *See*—
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Yamazaki, Hironobu; Uchida, Yoshiaki; and Nakaya, Akira, to Tekken Construction Co. Ltd. Device for removing gravels and the like from discharged mud in hydraulic tunnel boring system. 4,116,487, Cl. 299-1.000.

Yanagihara, Hiromichi; and Habu, Nobuo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine with an auxiliary chamber. 4,116,191, Cl. 123-30.00D.

Yanagihara, Hiromichi; and Miura, Nobuhiro, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine with an auxiliary combustion chamber. 4,116,234, Cl. 123-32.0SP.

Yang, Kang; and Scamehorn, John F., to Continental Oil Company. Treatment of alumina to reduce discoloration. 4,117,085, Cl. 423-264.000.

Yang, Kei-Hsiung, to General Electric Company. Continous photocathode for X-ray radiography having two-dimensional array of apertures. 4,117,365, Cl. 313-101.000.

Yanina, Anna Dmitrievna: *See*—
Mashkovsky, Mikhail Davydovich; Yakhontov, Leonid Nikolaevich; Ado, Andrei Dmitrievich; Kaminka, Mikhail Emmanuilovich; Mikhlina, Eva Evseevna; Vorobieva, Valentina Yakovlevna; Yanina, Anna Dmitrievna; and Komarova, Nadezhda Andreevna, 4,117,139, Cl. 424-267.000.

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Yasuhara, Yukihiko, to Denki Onkyo Co., Ltd. Deflection yoke. 4,117,516, Cl. 358-248.000.

Yasumatsu, Jun: *See*—
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Yeh, Kou-Min, to Bell Telephone Laboratories, Incorporated. Announcement generating arrangement utilizing digitally stored speech representations. 4,117,263, Cl. 179-1.0SM.

Yerkes, John W.; and Avery, James E., to Atlantic Richfield Company. Photovoltaic array including light diffuser. 4,116,718, Cl. 136-89.0PC.

Yokohama Rubber Co., Ltd., The: *See*—
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Yokoyama, Koji: *See*—
Ono, Yutaka; Fujii, Yoichi; Yokoyama, Koji; and Igarashi, Toshifumi, 4,117,399, Cl. 324-96.000.

Yonemoto, Masashi, to Mitsubishi Denki Kabushiki Kaisha. Command speed signal generation system. 4,117,382, Cl. 318-163.000.

York, James F., to Borg-Warner Corporation. Stabilizer for polymers. 4,116,926, Cl. 260-45.70P.

Yoshida, Yukihiro: *See*—
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Yoshikuni, Yoshiaki: *See*—
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Young, Alastair John, to Automotive Products Limited. Fluid pressure braking systems for vehicles. 4,116,309, Cl. 188-195.000.

Young, Eugene F.; Ray, Curtis M.; and Rogers, Ryland F., to Xerox Corporation. Background removal apparatus. 4,116,555, Cl. 355-15.000.

Young, Norman R.: *See*—
Stover, Don A.; Young, Norman R.; and Runnion, Glenmore J., 4,116,456, Cl. 280-33.99B.

Yu, Hwa Nien: *See*—
Ning, Tak Hung; Osburn, Carlton Morris; and Yu, Hwa Nien, 4,116,721, Cl. 148-1.500.

Yukinaga, Hisajiro; Sumimoto, Shinzaburo; Ishizuka, Ichiro; and Sugita, Jitsuo, to Shionogi & Co., Ltd. 3-Isoxazolylcarbamate derivatives. 4,116,671, Cl. 71-88.000.

Zahner, John C., to Mobil Oil Corporation. Method and system for effecting catalytic cracking of high boiling hydrocarbons with fluid conversion catalysts. 4,116,814, Cl. 208-78.000.

(Zaidanhojin) Sagami Chemical Research Center: *See*—
Isowa, Yoshikazu; Ohmori, Muneki; Kurita, Hideaki; Ichikawa, Tetsuya; Sato, Masanari; Mori, Kaoru; and Oyama, Kiyotaka, 4,116,768, Cl. 195-29.000.

Zakharova, Nina Vasilievna: *See*—
Abramov, Ivan Egorovich; Gershanov, Felix Borisovich; Dolidze, Vladimir Romanovich; Zakharova, Nina Vasilievna; Liakumovich, Alexandr Grigorievich; Michurov, Jury Ivanovich; Popov, Vasily Dmitrievich; Rutman, Grigory Iosifovich; and Shalimova, Zoya Stepanovna, 4,117,244, Cl. 568-799.000.

Zalipsky, Jerome J.: *See*—
Diamond, Julius; and Zalipsky, Jerome J., 4,117,165, Cl. 424-322.000.

Zamerowski, Thomas Joseph: *See*—
Olsen, Gregory Hammond; Zamerowski, Thomas Joseph; and Buiocchi, Charles Joseph, 4,116,733, Cl. 148-175.000.

Zanasi, Luciano, to Zanasi Nigris S.p.A. Dosing device. 4,116,247, Cl. 141-392.000.

Zanasi Nigris S.p.A.: *See*—
Zanasi, Luciano, 4,116,247, Cl. 141-392.000.

Zangger, Heinrich; and Zumbach, Heinz, to Zumbach Electronic AG. Apparatus for measuring the wall thickness of a moving tube wherein at least one measuring body inside the tube may be lifted off the tube by the motion of the tube. 4,117,402, Cl. 324-220.000.

Zaoui nee Serfozo, Ilona: *See*—
Huszar, Andor; Szekely, Geza; Rusznak, Istan; Trezl, Lajos; Bertalan, Gyorgy; Zaoui nee Serfozo, Ilona; and Molnar, Imre, 4,116,897, Cl. 260-17.40R.

Zappe, Hans Helmut, to International Business Machines Corporation. Josephson interferometer structure which suppresses resonances. 4,117,503, Cl. 357-5.000.

Zaromb, Solomon. Methods and apparatus for producing unsupported monocrystalline films of silicon and of other materials. 4,116,751, Cl. 156-600.000.

Zaugg, Hans; and Liebi, Harald. Solar energy collecting and concentrating apparatus. 4,116,221, Cl. 126-271.000.

Zecher, Robert F., to Advanced Plastics Machinery Corporation. Method and apparatus for deflashing. 4,115,960, Cl. 51-422.000.

Zega, Bogdan, to Battelle Memorial Institute. Method and apparatus for forming a deposit by means of ion plating using a magnetron cathode target as source of coating material. 4,116,791, Cl. 204-192.00N.

Zelenov, Jury Ivanovich: *See*—
Marushkin, Ruf Fedorovich; Zelenov, Jury Ivanovich; Kozlov, Nikolai Alexandrovich; Filin, Nikolai Prokopievich; Gurevich, Iosif Isaakovich; Usanov, Vladimir Vasilievich; Krasnikova, Oxana Kirillovna; Lyalin, Vladimir Nikolaevich; Bykasov, Viktor Ivanovich; Kirpichnikov, Felix Petrovich; Belyakov, Viktor Petrovich; Pronko, Vladimir Grigorievich; Epifanova, Vera Ivanovna; Nikitkin, Vasily Dmitrievich; Kandaurov, Zakhar Ivanovich; Mischenko, Tamara Sergeevna; Lavrentiev, Alexandr Alexeevich; Kondratieva, Galina Alexeevna; Orekhov, Alexandr Mikhailovich; Onosovsky, Evgeny Valentinovich; Kalinin, Elvin Konstantinovich; Dreitser, Genrikh Alexandrovich; Kirikov, Dmitry Arkadievich; and Chernyshev, Boris Alexandrovich, 4,116,270, Cl. 165-162.000.

Zeller Corporation, The: *See*—
Weible, Warren W., 4,116,018, Cl. 64-12.000.

Zeller, Gregor, to Petri AG, Firma. Energy absorbing structure for the steering column of a motor vehicle. 4,116,087, Cl. 74-552.000.

Zemlyanskaya, Evgenia Ivanovna: *See*—
Nasyrov, Gakif Zakirovich; Zemlyanskaya, Evgenia Ivanovna; and Ravdonikas, Izabella Vladislavovna, 4,117,077, Cl. 423-127.000.

Zenker, Walter, to Klockner-Humboldt-Deutz Aktiengesellschaft. Change gear transmission in group arrangement, especially for motor vehicles for use in agriculture and in the construction field. 4,116,090, Cl. 74-745.000.

Zhuravlev, Nikolai Danilovich: *See*—
Korshak, Vasily Vladimirovich; Vinogradova, Svetlana Vasilievna; Storozhuk, Ivan Pavlovich; Valetsky, Petr Maximilianovich; Sokolov, Lev Borisovich; Mikitaev, Abdulakh Kazbulatovich; Askadsky, Andrei Alexandrovich; Kochergin, Jury Sergeevich; Slonimsky, Grigory Lvovich; Shirokova, Larisa Borisovna; Nebosenko, Ljudmila Fedorovna; and Zhuravlev, Nikolai Danilovich, 4,116,940, Cl. 528-173.000.

Ziehm, Richard T.: *See*—
Adamek, John A.; and Ziehm, Richard T., 4,116,558, Cl. 355-24.000.

Ziemba, Theodore J. Fluid pallet and a method of stacking and storing goods. 4,116,344, Cl. 214-10.50D.

Zimmer, Max: *See*—
Mathis, Paul; and Zimmer, Max, 4,117,547, Cl. 366-17.000.

Zimmerman, Gary Lee; Clark, Richard Paul; and Rehm, John A., to AMP Incorporated. Closed entry connector housing. 4,116,520, Cl. 339-59.00R.

Zin-Plas Corporation: *See*—
Nelson, Merritt J., 4,116,210, Cl. 137-119.000.

Zinezi, Waldemar, to Inox Industria E Comercio de Aco S/A. Pulp refining disk and method of making same. 4,116,392, Cl. 241-296.000.

Zinnes, Harold; Lindo, Neil A.; and Shavel, John, Jr., to Warner-Lambert Company. 2-[(N-2-pyridylcarbamoyl)methyl]saccharin. 4,116,964, Cl. 260-294.80C.

Zitelli, William E.; and Szabo, Andras I., to Westinghouse Electric Corp. Single-point analog subsystem interfaced with a computer. 4,117,477, Cl. 340-347.0NT.

Zito, Ralph, Jr., to General Engineering Labs. Sulfite anolyte and persulfate catholyte fuel cell. 4,117,204, Cl. 429-19.000.

Zneimer, Joel E.: *See*—
Whittle, William C.; and Zneimer, Joel E., 4,117,522, Cl. 360-109.000.

Zojirushi Vacuum Bottle Co., Ltd.: *See*—
Takenakashima, Takefumi; and Takatuki, Toyohiko, 4,116,366, Cl. 222-131.000.

Zondek, Klaus. Process for the freeze concentration of solutions. 4,116,652, Cl. 62-534.000.

Zondler, Helmut: *See*—
Lehmann, Hans; and Zondler, Helmut, 4,117,038, Cl. 260-837.00R.

Zoor, Reinhold, to Heinrich Wunder KG. Ski binding. 4,116,463, Cl. 280-615.000.

Zortea, Michel, to Saint-Gobain Industries. Production of flat glass. 4,116,660, Cl. 65-99.00A.

Zuckerman, Herman A.: *See*—
Belmuth, Harold M.; Leto, Alfred R., London, Lawrence; and Zuckerman, Herman A., 4,115,938, Cl. 40-152.000.

Zumbach Electronic AG.: *See*—
Zangger, Heinrich; and Zumbach, Heinz, 4,117,402, Cl. 324-220.000.

Zumbach, Heinz: *See*—
Zangger, Heinrich; and Zumbach, Heinz, 4,117,402, Cl. 324-220.000.

Zunkel, Richard L., to Eaton Corporation. Zero force hold open door closer. 4,115,897, Cl. 16-49.000.

Zurawski, Ronald Anthony, to Motorola, Inc. Handset locking and release mechanism. 4,117,276, Cl. 179-161.000.

Zwyro A.G.: *See*—
Zwyssig, Robert; and Tesch, Bernhard, 4,115,904, Cl. 24-19.000.

Zwyssig, Robert; and Tesch, Bernhard, to Zwyro A.G. Lock for bracelets, belts and the like. 4,115,904, Cl. 24-19.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 26TH DAY OF SEPTEMBER, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Anderson, Thomas E.; and Walden, John P., to General Electric Company. Inverter having forced turn-off. Re. 29,788, Cl. 363-97.000.

Apodaca, Ruben T.: *See—*
Chadwick, Donald H.; and Apodaca, Ruben T., Re. 29,784, Cl. 174-68.500.

Appleton Electric Company: *See—*
Rutkowski, John L., Re. 29,780, Cl. 339-91.00R.

Bargen, David W., to Orrox Corporation. Color phase matching system for magnetic video tape recordings. Re. 29,787, Cl. 358-4.000.

Bio-Med Devices, Inc.: *See—*
Stewart, Jeffrey L., Re. 29,778, Cl. 128-145.800.

Chadwick, Donald H.; and Apodaca, Ruben T., to International Electronics Research Corp. Thermal dissipating metal core printed circuit board. Re. 29,784, Cl. 174-68.500.

Crowley, Francis X. Concrete tank of precast concrete panels with pretensioned beam means. Re. 29,777, Cl. 52-224.000.

General Electric Company: *See—*
Anderson, Thomas E.; and Walden, John P., Re. 29,788, Cl. 363-97.000.

International Electronics Research Corp.: *See—*
Chadwick, Donald H.; and Apodaca, Ruben T., Re. 29,784, Cl. 174-68.500.

IU Technology Corporation: *See—*
Smith, Charles L.; and Webster, William C., Re. 29,783, Cl. 210-59.000.

Leschek, Walter C.; and McShane, James L., to Westinghouse Electric Corp. Replaceable element ultrasonic flowmeter transducer. Re. 29,785, Cl. 310-327.000.

McShane, James L.: *See—*
Leschek, Walter C.; and McShane, James L., Re. 29,785, Cl. 310-327.000.

McWhirter, John R., to Union Carbide Corporation. High oxygen utilization in BOD-containing water treatment. Re. 29,781, Cl. 210-7.000.

McWhirter, John R., to Union Carbide Corporation. Cyclic oxygenation of BOD-containing water. Re. 29,782, Cl. 210-7.000.

Morris, Glenn H. Child-proof and pharmacist-assisting reversible closure for containers. Re. 29,779, Cl. 215-206.000.

Orrox Corporation: *See—*
Bargen, David W., Re. 29,787, Cl. 358-4.000.

Rutkowski, John L., to Appleton Electric Company. Multiple socket assembly for electrical components. Re. 29,780, Cl. 339-91.00R.

Sarkes Tarzian, Inc.: *See—*
Weigel, Morton L., Re. 29,786, Cl. 334-86.000.

Smith, Charles L.; and Webster, William C., to IU Technology Corporation. Process for treating aqueous chemical waste sludges and compositions produced thereby. Re. 29,783, Cl. 210-59.000.

Stewart, Jeffrey L., to Bio-Med Devices, Inc. Pediatric respirator. Re. 29,778, Cl. 128-145.800.

Union Carbide Corporation: *See—*
McWhirter, John R., Re. 29,781, Cl. 210-7.000.
McWhirter, John R., Re. 29,782, Cl. 210-7.000.

Walden, John P.: *See—*
Anderson, Thomas E.; and Walden, John P., Re. 29,788, Cl. 363-97.000.

Webster, William C.: *See—*
Smith, Charles L.; and Webster, William C., Re. 29,783, Cl. 210-59.000.

Weigel, Morton L., to Sarkes Tarzian, Inc. Combined 82-position UHF and VHF television tuner with memory fine tuning. Re. 29,786, Cl. 334-86.000.

Westinghouse Electric Corp.: *See—*
Leschek, Walter C.; and McShane, James L., Re. 29,785, Cl. 310-327.000.

LIST OF PLANT PATENTEES

Fischer, Arnold W., to Geo. J. Ball, Inc. Violet plant named Vera. 4,308, 9-26-78, Cl. 69.000.

Geo. J. Ball, Inc.: *See—*
Fischer, Arnold W., 4,308, Cl. 69.000.

Hope, Claude, to Mikkelsens, Inc. Kalanchoe plant. 4,306, 9-26-78, Cl. 68.000.

Hope, Claude, to Mikkelsens, Inc. Kalanchoe plant. 4,307, 9-26-78, Cl. 68.000.

McGredy, Samuel D. Rose plant. 4,309, 9-26-78, Cl. 16.000.

Mikkelsens, Inc.: *See—*
Hope, Claude, 4,306, Cl. 68.000.
Hope, Claude, 4,307, Cl. 68.000.

Ott, Cleveland. Poinsettia. 4,310, 9-26-78, Cl. 86.000.

LIST OF DESIGN PATENTEES

Adamski, Henry Stanislaus, to Eastman Kodak Company. Sample cup tray for chemical analysis of biological fluids. 249,706, 9-26-78, Cl. D24-32.000.

Adamski, Henry Stanislaus: *See—*
Smith, Michael Richmond; Ferris, James Elias; and Adamski, Henry Stanislaus, 249,708, Cl. D24-56.000.

Aisin Seiki Kabushiki Kaisha: *See—*
Kasahara, Takahiko; Shichi, Sigeharu; Kato, Masayuki; and Suito, Senji, 249,693, Cl. D15-68.000.

American Home Products Corp.: *See—*
Dali, Carmelo P., 249,641, Cl. D9-224.000.

American Motors Corporation: *See—*
Mashigan, Charles, 249,675, Cl. D12-156.000.

American Safety Razor Company: *See—*
Iten, Clemens A., 249,637, Cl. D9-187.000.

American Wheel & Engineering Co., Inc.: *See—*
Rotheiser, Jordan I., 249,678, Cl. D12-204.000.
Rotheiser, Jordan I., 249,679, Cl. D12-204.000.

Ames, John B. Dispensing top for granulated material. 249,642, 9-26-78, Cl. D9-257.000.

AMF Incorporated: *See—*
Thomas, George A., 249,690, Cl. D15-14.000.

Arndt, James J.: *See—*
Arndt, Otto G.; and Arndt, James J., 249,718, Cl. D34-5.0CB.

Arndt, Otto G.; and Arndt, James J. Projector for toy golf clug balls or the like. 249,718, 9-26-78, Cl. D34-5.0CB.

Arvey Corporation: *See—*
Gordon, William Donald, Sr., 249,738, Cl. D34-15.0LL.

Azlon Products Ltd.: *See—*
Elliott, Barry Jack, 249,635, Cl. D9-71.000.

Ballas, George C., to Weed Eater, Inc. Rotary lawn edger, trimmer or similar article. 249,630, 9-26-78, Cl. D8-8.000.

Balmforth, Ernest Lynn: *See—*
Cosman, Michael A., 249,722, Cl. D34-5.0GP.
Cosman, Michael A., 249,723, Cl. D34-5.0GP.
Cosman, Michael A., 249,724, Cl. D34-5.0GP.
Cosman, Michael A., 249,725, Cl. D34-5.0GP.

Balzano, Alfiero F. Plaque. 249,659, 9-26-78, Cl. D11-132.000.

Baugh, Benjamin Charles: *See—*
Zimmerman, Alan Ross; and Baugh, Benjamin Charles, 249,703, Cl. D23-142.000.

Beatrice Foods Co.: *See—*
Gullaksen, Gregory G.; and Lordahl, Var E., 249,655, Cl. D10-64.000.

Bergman, Andrew I., to Quaker Oats Company, The. Wheeled toy and figure therefor. 249,736, 9-26-78, Cl. D34-15.0AN.

Berkman, Joseph L. Carrying case for tape cartridges and cassettes. 249,743, 9-26-78, Cl. D87-1.00D.

Bothun, Eugene L., to Clarke-Gravely Corporation. Push sweeper. 249,692, 9-26-78, Cl. D15-50.000.

Bowman, Arleen, to Bowman Trading Co., Inc. Make-up brush. 249,600, 9-26-78, Cl. D4-25.000.

Bowman Trading Co., Inc.: *See*—
Bowman, Arleen, 249,600, Cl. D4-25.000.

Bozicnik, Ronald. Combined storage and tying container for newspapers. 249,617, 9-26-78, Cl. D6-184.000.

Braun A G: *See*—
Rams, Dieter, 249,684, Cl. D14-33.000.

Braun AG: *See*—
Rams, Dieter, 249,683, Cl. D14-33.000.

Burke, Frederick A.; and Long, Douglas A., to Clairol Inc. Moisturizing massager. 249,707, 9-26-78, Cl. D24-41.000.

Burridge, Robert E., to Contourpedic Corporation. Seat. 249,601, 9-26-78, Cl. D6-5.000.

Burroughs Corporation: *See*—
Clayton, Richard G.; and Schade, Robert C., 249,686, Cl. D14-44.000.

Burton, Theodore R. Convenience food service center. 249,610, 9-26-78, Cl. D6-169.000.

Burton, Theodore R. Convenience food service center. 249,611, 9-26-78, Cl. D6-169.000.

Burton, Theodore R. Convenience food service center. 249,612, 9-26-78, Cl. D6-169.000.

Burton, Theodore R. Convenience food service center. 249,613, 9-26-78, Cl. D6-169.000.

Burton, Theodore R. Convenience food service center. 249,614, 9-26-78, Cl. D6-169.000.

Chadbourne, Gilbert R., to Keyes Fibre Company. Packing tray for fluorescent tubes. 249,638, 9-26-78, Cl. D9-189.000.

Clairol Inc.: *See*—
Burke, Frederick A.; and Long, Douglas A., 249,707, Cl. D24-41.000.

Clarke-Gravely Corporation: *See*—
Bothun, Eugene L., 249,692, Cl. D15-50.000.

Clayton, Richard G.; and Schade, Robert C., to Burroughs Corporation. Modular document processing encoder. 249,686, 9-26-78, Cl. D14-44.000.

Cline, Ted L. Truck tailgate. 249,677, 9-26-78, Cl. D12-196.000.

Clowers, Earl R.; Davis, John C.; and Pearman, Fred E., to Singer Company, The. Guiding and locking device for electrical cords. 249,691, 9-26-78, Cl. D15-62.000.

Coleman Company, Inc., The: *See*—
Zimmerman, Alan Ross; and Baugh, Benjamin Charles, 249,703, Cl. D23-142.000.

Communications Power, Inc.: *See*—
Wisherd, David S.; Mieth, Stephen L.; and Mitchell, Larry H., 249,689, Cl. D14-94.000.

Connolly, Joseph B. Stand for potted plants. 249,616, 9-26-78, Cl. D6-182.000.

Contourpedic Corporation: *See*—
Burridge, Robert E., 249,601, Cl. D6-5.000.

Cortez, Robert S. Automobile armrest. 249,673, 9-26-78, Cl. D12-155.000.

Cosman, Michael A., to Balmforth, Ernest Lynn. Playing piece for game. 249,722, 9-26-78, Cl. D34-5.0GP.

Cosman, Michael A., to Balmforth, Ernest Lynn. Playing piece for game. 249,723, 9-26-78, Cl. D34-5.0GP.

Cosman, Michael A., to Balmforth, Ernest Lynn. Playing piece for game. 249,724, 9-26-78, Cl. D34-5.0GP.

Cosman, Michael A., to Balmforth, Ernest Lynn. Playing piece for game. 249,725, 9-26-78, Cl. D34-5.0GP.

Cosman, Michael A., to Ernest Lynn Balmforth. Playing piece for game. 249,726, 9-26-78, Cl. D34-5.0GP.

Dali, Carmelo P., to American Home Products Corp. Dispensing container or the like. 249,641, 9-26-78, Cl. D9-224.000.

Data Packaging Corporation: *See*—
Lyman, George, 249,744, Cl. D87-1.00R.

Davis, John C.: *See*—
Clowers, Earl R.; Davis, John C.; and Pearman, Fred E., 249,691, Cl. D15-62.000.

DiBartolo, Vincent, to Mele Manufacturing Co. Display stand for pierced earrings. 249,603, 9-26-78, Cl. D6-85.000.

Dillon, Nicholas Thomas Edward. Welding shield. 249,597, 9-26-78, Cl. D2-234.000.

Dolezal, Joseph R. Combination coaster and ashtray. 249,712, 9-26-78, Cl. D27-21.000.

Dominguez, Olga: *See*—
Hester, Gene A.; and Dominguez, Olga, 249,697, Cl. D19-59.000.

Droegemuller, Walter H., to Toro Company, The. Folding control handle for lawn and garden implement. 249,629, 9-26-78, Cl. D8-1.000.

Dugan, Jay Michael. Wood stove. 249,702, 9-26-78, Cl. D23-93.000.

Eastern Company, The: *See*—
Pastva, John V., Jr., 249,634, Cl. D8-346.000.

Eastman Kodak Company: *See*—
Adamski, Henry Stanislaus, 249,706, Cl. D24-32.000.
Smith, Michael Richmond; Ferris, James Elias; and Adamski, Henry Stanislaus, 249,708, Cl. D24-56.000.

Edwards, Frederick Harold, to Vinyl Clad Proprietary Limited. Combined packaging container and lid therefor. 249,640, 9-26-78, Cl. D9-220.000.

Elliott, Barry Jack, to Azlon Products Ltd. Bottle. 249,635, 9-26-78, Cl. D9-71.000.

Emerson Electric Co.: *See*—
McElroy, Jerry W.; and Kerper, Michael A., 249,652, Cl. D10-51.000.
McElroy, Jerry W.; and Kerper, Michael A., 249,653, Cl. D10-51.000.

Ernest Lynn Balmforth: *See*—
Cosman, Michael A., 249,726, Cl. D34-5.0GP.

Ferris, James Elias: *See*—
Smith, Michael Richmond; Ferris, James Elias; and Adamski, Henry Stanislaus, 249,708, Cl. D24-56.000.

Fields, Gary Conway, to Leemah Electronics, Inc. Telephone carrier equipment multitester. 249,658, 9-26-78, Cl. D10-78.000.

Flesher, Robert W. Water pipe. 249,711, 9-26-78, Cl. D27-03.000.

Forward, Inc.: *See*—
Silbernagel, Frederick J., 249,665, Cl. D12-95.000.

Fried, Donald P. Lawn pool target frame. 249,728, 9-26-78, Cl. D34-5.0NN.

Frisbey, De Vern C. Knock down display stand. 249,615, 9-26-78, Cl. D6-180.000.

Fujimoto, Munenori: *See*—
Kushida, Keizo; Ohta, Kikuo; Fujimoto, Munenori; and Igo, Toshio, 249,682, Cl. 14-12.000.

Gebruder Pletscher: *See*—
Pletscher, Oskar, 249,676, Cl. D12-158.000.

Geitenbeek, Theodoor Willem. Clock body. 249,648, 9-26-78, Cl. D10-1.000.

General Research of Electronics, Inc.: *See*—
Imazeki, Kazuyoshi, 249,687, Cl. D14-68.000.

Gilbertson, Glen A. Farrowing crate. 249,713, 9-26-78, Cl. D30-1.000.

Glasenapp, Jorg: *See*—
Glasenapp, Werner; and Glasenapp, Jorg, 249,681, Cl. D13-2.000.

Glasenapp, Werner; and Glasenapp, Jorg, to Union Sils, van de Loo & Co. Bicycle light generator. 249,681, 9-26-78, Cl. D13-2.000.

Goldman, Jerrold J.; and Petre, Robert. Jewelry organizer or similar article. 249,607, 9-26-78, Cl. D6-130.000.

Goodall, Donald Terry. Pouring spout. 249,647, 9-26-78, Cl. D9-290.000.

Goodwin, David C. Combined coin chest and coin. 249,661, 9-26-78, Cl. D11-157.000.

Gordon, William Donald, Sr., to Arvey Corporation. Toy store. 249,738, 9-26-78, Cl. D34-15.0LL.

Gremlin Industries, Inc.: *See*—
Olson, Verl O., 249,729, Cl. D34-5.00J.

Griffiths, Leighton E. Golf tee level. 249,657, 9-26-78, Cl. D10-o9.000.

Grundfor, Scott I.: *See*—
Tamura, Jeffrey K.; and Grundfor, Scott I., 249,674, Cl. D12-156.000.

Gullaksen, Gregory G.; and Lordahl, Var E., to Beatrice Foods Co. Faucet connector size guide. 249,655, 9-26-78, Cl. D10-64.000.

Hadjis, George C. Game board. 249,719, 9-26-78, Cl. D34-5.0SS.

Hall, Lloyd Vernon. Mounting bracket for fishing outrigger pole. 249,664, 9-26-78, Cl. D12-70.000.

Heaton, G. Norman: *See*—
Hogg, John W. L.; and Heaton, G. Norman, 249,639, Cl. D9-193.000.

Hellmann, Reiner, to Wilhelm Boos, Jr. (GmbH & Co.). Scissors. 249,631, 9-26-78, Cl. D8-57.000.

Henkels, Walter. Ball point pen. 249,696, 9-26-78, Cl. D19-45.000.

Hester, Gene A.; and Dominguez, Olga. Combined educational game board and counting board for teaching fundamentals of arithmetic. 249,697, 9-26-78, Cl. D19-59.000.

Hirosawa, Nobuyoshi, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Digital clock. 249,651, 9-26-78, Cl. D10-15.000.

Hogg, John W. L.; and Heaton, G. Norman, to Shepherd Products U.S. Inc. Display package. 249,639, 9-26-78, Cl. D9-193.000.

Hughes, Robert E., to Xerox Corporation. Paper take-up reel for web fed facsimile transceiver or the like. 249,688, 9-26-78, Cl. D14-94.000.

Igo, Toshio: *See*—
Kushida, Keizo; Ohta, Kikuo; Fujimoto, Munenori; and Igo, Toshio, 249,682, Cl. 14-12.000.

Imazeki, Kazuyoshi, to General Research of Electronics, Inc. Radio transceiver and the like. 249,687, 9-26-78, Cl. D14-68.000.

Iten, Clemens A., to American Safety Razor Company. Dispenser for razor blade cartridges. 249,637, 9-26-78, Cl. D9-187.000.

J.W.T. Industries: *See*—
Terdina, John W.; and Kec, Clarence A., 249,606, Cl. D6-125.000.

John Thomas Batts, Inc.: *See*—
Wolff, Douglas F., 249,619, Cl. D6-247.000.

Kabushiki Kaisha Sankyo Seiki Seisakusho: *See*—
Hirosawa, Nobuyoshi, 249,651, Cl. D10-15.000.

Kasahara, Takahiko; Shichi, Sigeharu; Kato, Masayuki; and Suito, Senji, to Aisin Seiki Kabushiki Kaisha. Sewing machine. 249,693, 9-26-78, Cl. D15-68.000.

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Kushida, Keizo; Ohta, Kikuo; Fujimoto, Munenori; and Igo, Toshio, to Matsushita Electric Industrial Co., Ltd. Combination microphone, speaker and control unit for a radio transceiver. 249,682, 9-26-78, Cl. 14-12.000.

Lage, Lyle W. Pig waterer. 249,715, 9-26-78, Cl. D30-15.000.

Langieri, Michael, to Louis Marx & Co., Inc. Pinball game cabinet. 249,731, 9-26-78, Cl. D34-5.0JJ.

Lapinski, Richard. Hand caster. 249,699, 9-26-78, Cl. D22-25.000.

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Levine, Robert F. Housing for plant turntable plant rotator. 249,628, 9-26-78, Cl. D8-1.000.

Linton, John T. Reusable golf and bowl hand scoreplate. 249,730, 9-26-78, Cl. D34-5.0MM.

London, James T. Device for use in implanting a prosthesis in the humerus. 249,705, 9-26-78, Cl. D24-26.000.

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Lyman, George, to Data Packaging Corporation. File box. 249,744, 9-26-78, Cl. D87-1.00R.

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McElroy, Jerry W.; and Kerper, Michael A., to Emerson Electric Co. Casing for a timer controlled thermostat or the like. 249,653, 9-26-78, Cl. D10-51.000.

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Rotheiser, Jordan I., to American Wheel & Engineering Co., Inc. Molded wheel. 249,679, 9-26-78, Cl. D12-204.000.

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VanderWaal, Jack C., 249,671, Cl. D12-155.000.
VanderWaal, Jack C., 249,672, Cl. D12-155.000.

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Seibel, Ben, to Oxford Hall Silversmiths, Ltd. Spoon or similar article of flatware. 249,626, 9-26-78, Cl. D7-137.000.

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Smith, Ernest L., to Phillips Petroleum Company. Closure or similar article. 249,643, 9-26-78, Cl. D9-267.000.
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VanderWaal, Jack C., to Sea-Lect Products Inc. Behind seat storage compartment for trucks or the like. 249,672, 9-26-78, Cl. D12-155.000.
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CLASSIFICATION OF PATENTS

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425.4 P	4,116,068
425.4 R	4,116,070
429	4,116,071
433	4,116,072
483	4,116,073
607	4,116,074
708	4,116,075

CLASS 74

7 A	4,116,077
10.27	4,116,078
217 B	4,116,079
230.17 A	4,116,080
243 R	4,116,081
342	4,116,084
360	4,116,082
393	4,116,083
422	4,116,085
532	4,116,086
552	4,116,087
572	4,116,088
687	4,116,089
745	4,116,090
801	4,116,091

CLASS 75

11	4,116,678
34	4,116,679
41	4,116,680
	4,116,681
123 H	4,116,682
125	4,116,683
126 C	4,116,684
128 B	4,116,685
154	4,116,686
177	4,116,687
229	4,116,688
	4,116,689
257	4,116,690

CLASS 81

9.5 R	4,116,092
57.39	4,116,093

CLASS 82

8	4,116,094
71	4,116,095

CLASS 83

101	4,116,096
155	4,116,097
425.4	4,116,098
571	4,116,099
698	4,116,100
747	4,116,101

CLASS 84

1.22	4,116,102
1.24	4,116,103
267	4,116,107
330	4,116,108

CLASS 85

3 S	4,116,104
66	4,116,105
71	4,116,106

CLASS 86

23	4,116,109

CLASS 90

12 R	4,116,110
15 R	4,116,111

CLASS 91

380	4,116,112

CLASS 92

24	4,116,113
130 A	4,116,114
168	4,116,115

CLASS 93

35 R	4,116,116

CLASS 96

1.5 R	4,116,691
27 E	4,116,692
35.1	4,116,693
41	4,116,694
86 P	4,116,695
87 R	4,116,696
95	4,116,697
111	4,116,700

CLASS 99

361	4,116,117
423	4,116,118
450.6	4,116,119
483	4,116,120

CLASS 100

39	4,116,121
48	4,116,122
233	4,116,123

CLASS 101

170	4,116,124
212	4,116,125
217	4,116,126
232	4,116,127
425	4,116,128
426	4,116,129

CLASS 102

20	4,116,130
103	4,116,131
200	4,116,132
215	4,116,133

CLASS 104

111	4,116,134

CLASS 105

378	4,116,135

CLASS 106

2	4,116,698
3	4,116,699
14.14	4,116,701
15 FP	4,116,702
54	4,116,704
75	4,116,703
90	4,116,705
	4,116,706
104	4,116,707
113	4,116,730
281 R	4,116,708
284	4,116,709
290	4,116,710
309	4,116,711

CLASS 110

251	4,116,136

CLASS 111

2	4,116,137
7	4,116,138
	4,116,139
52	4,116,140

CLASS 112

121.11	4,116,143
121.26	4,116,142
158 E	4,116,144
212	4,116,145
217.1	4,116,147
217.2	4,116,146
262	4,116,148

CLASS 113

116 D	4,116,149

CLASS 114

74 A	4,116,150
102	4,116,151
106	4,116,152
244	4,116,153
264	4,116,009

CLASS 116

35 A	4,116,154
65	4,116,155
70	4,116,156
125	4,116,157
142 R	4,116,158

CLASS 118

34	4,116,159
48	4,116,160
49.1	4,116,161
104	4,116,162
303	4,116,163
648	4,116,141

CLASS 119

3	4,116,164
14.47	4,116,165
99	4,116,166

CLASS 122

33	4,116,167
406 S	4,116,168

CLASS 123

30 D	4,116,191
32 EC	4,116,169
32 EE	4,116,170
32 SP	4,116,234
41.57	4,116,171
52 M	4,116,172
117 R	4,116,173
	4,116,174
	4,116,175
119 A	4,116,176
	4,116,178
	4,116,179
	4,116,180
	4,116,181
	4,116,182
119 R	4,116,177
122 F	4,116,183
136	4,116,184
139 AM	4,116,186
139 AW	4,116,185
141	4,116,187
148 CC	4,116,188
190 BB	4,116,189
202	4,116,190

CLASS 124

51 R	4,116,192
72	4,116,193
87	4,116,194

CLASS 126

271	4,116,219
	4,116,220
	4,116,221
	4,116,222
	4,116,223
	4,116,224
	4,116,225
299 D	4,116,226

CLASS 127

46 R	4,116,712

CLASS 128

2 F	4,116,227

2 R 4,116,228
2 V 4,116,229
2.05 M 4,116,230
2.1 Z 4,116,231
20 4,116,232
32 4,116,233
69 4,116,235
80 C 4,116,236
142.7 4,116,237
145.8 Re.29,778
172.1 4,116,238
184 4,116,239
218 M 4,116,240
260 4,116,241
266 4,116,195
272.3 4,116,196
286 4,116,197
303.1 4,116,199
303.15 4,116,198
305 4,116,200
351 4,116,201
359 4,116,202

CLASS 131

138 4,116,203
173 4,116,204

CLASS 132

85 4,116,205

CLASS 134

3 4,116,713
4,116,714
6 4,116,715
134 4,116,716

CLASS 135

4 R 4,116,206

CLASS 136

89 H 4,116,207
89 PC 4,116,718
89 SJ 4,116,717

CLASS 137

1 4,116,208
38 4,116,209
119 4,116,210
205 4,116,211
220 4,116,212
360 4,116,213
522 4,116,214
596.18 4,116,215
624.13 4,116,216
625.12 4,116,217
627.5 4,116,218

CLASS 139

59 4,116,242
435 4,116,243

CLASS 140

112 4,116,244

CLASS 141

98 4,116,245
362 4,116,246
392 4,116,247

CLASS 144

2 R 4,116,248
3 D 4,116,249
34 R 4,116,250
193 R 4,116,251
309 D 4,116,252

CLASS 148

1.5 4,116,719
4,116,720
4,116,721
4,116,722
3 4,116,723
4,116,724
20.3 4,116,725
31.55 4,116,727
31.57 4,116,726
108 4,116,728
111 4,116,729
161 4,116,731
175 4,116,732
4,116,733

CLASS 149

19.2 4,116,734

CLASS 150

33 4,116,253

CLASS 152

233 4,116,254
352 R 4,116,255

CLASS 156

79 4,116,735
4,116,736
85 4,116,737
167 4,116,738
169 4,116,739
205 4,116,740
239 4,116,741
289 4,116,742
333 4,116,743
352 4,116,744
362 4,116,745
384 4,116,746
4,116,747
526 4,116,748
555 4,116,749
563 4,116,750
600 4,116,751
624 4,116,752
629 4,116,753
656 4,116,754
659 4,116,755

CLASS 157

13 4,116,256

CLASS 159

45 4,116,756
47 WL 4,116,757

CLASS 160

168 R 4,116,257
213 4,116,258

CLASS 162

28 4,116,758
32 4,116,759
56 4,116,760
152 4,116,761
199 4,116,762
301 4,116,763
380 4,116,259

CLASS 164

295 4,116,260
448 4,116,261
4,116,262

CLASS 165

27 4,116,263
47 4,116,264
95 4,116,265
105 4,116,266
110 4,116,267
111 4,116,268
126 4,116,269
162 4,116,270
166 4,116,271

CLASS 166

248 4,116,273
250 4,116,274
303 4,116,275
314 4,116,276
315 4,116,277
340 4,116,272

CLASS 168

4 4,116,278

CLASS 171

58 4,116,279

CLASS 172

266 4,116,280
267 4,116,281
311 4,116,282
443 4,116,283

CLASS 173

140 4,116,284

CLASS 174

15 BH 4,117,254
31 R 4,117,255
40 R 4,117,256
52 R 4,117,257
53 4,117,258
68.5 Re.29,784
92 4,117,259
106 R 4,117,260
164 4,117,261

CLASS 175

7 4,116,285
19 4,116,286
65 4,116,287
66 4,116,288
329 4,116,289

CLASS 176

38 4,116,764
4,116,765
4,116,766
87 4,116,767

CLASS 177

149 4,116,290

CLASS 179

1 PC 4,117,264
1 SM 4,117,263
1 SP 4,117,265
1 SW 4,117,262
6 R 4,117,266
15 AT 4,117,268
15 BS 4,117,267
15 BW 4,117,269
18 BE 4,117,270
82 4,117,271
84 R 4,117,272
98 4,117,273
99 4,117,274
111 E 4,117,275
161 4,117,276
170.6 4,117,277
175.2 C 4,117,278

CLASS 180

6.2 4,116,291
6.48 4,116,292
43 B 4,116,293
44 F 4,116,294
82 C 4,116,295
101 4,116,296
114 4,116,297
139 4,116,298

CLASS 181

113 4,116,299
114 4,116,300
119 4,116,301
192 4,116,302
252 4,116,303

CLASS 182

2 4,116,304
3 4,116,305

CLASS 187

29 R 4,116,306

CLASS 188

106 P 4,116,307
171 4,116,308
195 4,116,309

CLASS 190

42 4,116,310
49 4,116,311

CLASS 191

64 4,116,312

CLASS 192

3.63 4,116,313
46 4,116,314
48.8 4,116,322
48.92 4,116,315
58 A 4,116,316
58 B 4,116,317
4,116,318
64 4,116,319
89 A 4,116,320
103 F 4,116,321

CLASS 195

29 4,116,768
51 R 4,116,769
63 4,116,770
4,116,771
64 4,116,772
99 4,116,773
4,116,774
103.5 M 4,116,775
103.7 4,116,776
127 4,116,777
139 4,116,778

CLASS 198

453 4,116,323
472 4,116,324
484 4,116,325
498 4,116,326
560 4,116,327
648 4,116,328

CLASS 200

5 A 4,117,279
6 B 4,117,280
33 R 4,117,282
52 R 4,117,283
61.25 4,117,281
67 G 4,117,284
76 4,117,285
4,117,286
82 R 4,117,287
144 R 4,117,288
148 B 4,117,289
243 4,117,290
268 4,117,291
340 4,117,292

CLASS 201

34 4,116,779

CLASS 204

2.1 4,116,780
98 4,116,781
147 4,116,782
150 4,116,783
159.13 4,116,786
159.14 4,116,785
159.16 4,116,784
159.23 4,116,787
4,116,788
180 R 4,116,789
188 4,116,790
192 E 4,116,792
192 N 4,116,791
192 R 4,116,793
4,116,794
195 F 4,116,798
195 M 4,116,796
195 S 4,116,795
4,116,797
224 M 4,116,799
247 4,116,801
252 4,116,800
4,116,802
272 4,116,803
284 4,116,804
290 F 4,116,805
4,116,807
298 4,116,806

CLASS 206

1.5 4,116,329
44 R 4,116,330
150 4,116,331
209 4,116,332
380 4,116,333
453 4,116,334
492 4,116,335
524.8 4,116,336
591 4,116,337
610 4,116,338

CLASS 208

10 4,116,808
11 LE 4,116,809
11 R 4,116,810
44 4,116,811
46 4,116,813
48 AA 4,116,812
78 4,116,814
87 4,116,815
209 4,116,816
210 4,116,817
4,116,818
216 4,116,819
251 R 4,116,820
361 4,116,821

CLASS 209

11 4,116,822
44 4,116,823
262 4,116,824
570 4,116,435
699 4,116,339

CLASS 210

7 Re.29,781
Re.29,782
27 4,116,825
4,116,826
4,116,827
4,116,828
42 S 4,116,829
59 Re.29,783
63 R 4,116,830
68 4,116,831
83 4,116,832
4,116,833
96 R 4,116,834
100 4,116,835
198 C 4,116,836
4,116,837
209 4,116,838
222 4,116,839
279 4,116,840
321 B 4,116,841
330 4,116,842
391 4,116,843
446 4,116,844
4,116,845

CLASS 211

13 4,116,340
17 4,116,341
68 4,116,342
151 4,116,343

CLASS 214

10.5 D 4,116,344
37 4,116,345
145 A 4,116,346
4,116,347
309 4,116,348
654 4,116,349

CLASS 215

31 4,116,350
206 Re.29,779
216 4,116,351
270 4,116,352
274 4,116,353

CLASS 219

10.41 4,117,293
10.55 C 4,117,294
10.61 R 4,117,295
91.21 4,117,296
98 4,117,297
4,117,298
117.1 4,117,299
121 EM 4,117,301
121 LM 4,117,300
4,117,302
130.1 4,117,303
4,117,304
213 4,117,305
243 4,117,306
364 4,117,307
365 4,117,308
385 4,117,309
451 4,117,310
544 4,117,311
548 4,117,312

CLASS 220

20 4,116,354
83 4,116,355
85 R 4,116,356
205 4,116,357
222 4,116,358
265 4,116,359
273 4,116,360
4,116,361
284 4,116,362
448 4,116,363

CLASS 222

40 4,116,364
92 4,116,365
131 4,116,366
144.5 4,116,367
145 4,116,368
4,116,369
402.18 4,116,370
455 4,116,371
600 4,116,372

CLASS 224

42.21 4,116,373
55 4,116,374

CLASS 228

48 4,116,375
170 4,116,376

CLASS 229

48 R 4,115,909
87 F 4,116,378

CLASS 235

61 GM 4,117,313
88 R 4,117,315
92 SB 4,117,316
307 4,117,317
475 4,117,314

CLASS 236

12 A 4,116,377

CLASS 237

1 A 4,116,379
8 R 4,116,380

CLASS 238

10 E 4,116,381

CLASS 239

8 4,116,382
4,116,383
15 4,116,384
77 4,116,385
119 4,116,386
338 4,116,387
406 4,116,388
585 4,116,389

CLASS 241

24 4,116,390
171 4,116,391
296 4,116,392

CLASS 242

1 4,116,393
25 R 4,116,394
35.5 A 4,116,395
43 R 4,116,396
47.01 4,116,397
56 R 4,116,398
58.4 4,116,399
67.1 R 4,116,400
68.3 4,116,401
107.1 4,116,402
165 4,116,403

CLASS 244

3.23 4,116,404
12.4 4,116,405
16 4,116,406
4,116,407
114 R 4,116,408

CLASS 248

2 4,116,409
26 4,116,410
60 4,116,411
358 R 4,116,412
451 4,116,413
4,116,414

CLASS 249

35 4,116,415
54 4,116,416

CLASS 250

201 4,117,318
4,117,319
202 4,117,324
209 4,117,325
237 G 4,117,320
292 4,117,321
309 4,117,322
311 4,117,323
324 4,117,326
330 4,117,328
334 4,117,331
338 4,117,327
4,117,329
361 R 4,117,330
374 4,117,332
380 4,117,333
402 4,117,334
4,117,335
445 T 4,117,336
4,117,337
461 R 4,117,338
492 A 4,117,339
4,117,340
561 4,117,341

CLASS 251

122 4,116,417
149.2 4,116,418
196 4,116,419

CLASS 252

32.7 E 4,116,871
4,116,872
33 4,116,873
46.7 4,116,874
49.6 4,116,876
49.7 4,116,875
72 4,116,877
78.1 4,116,846
78.3 4,116,847
90 4,116,848
94 4,116,878
103 4,116,849
4,116,850
4,116,851
135 4,116,852
142 4,116,853
167 4,116,854
182 4,116,855
184 4,116,856
4,116,857
4,116,858
186 4,116,859
192 4,116,860
299 4,116,861
300 4,116,862
301.1 W 4,116,863
301.4 H 4,116,865
301.6 S 4,116,864
316 4,116,866
416 4,116,867
426 4,116,879
428 4,116,868
429 R 4,116,880
431 P 4,116,869
439 4,116,870
440 4,116,881
448 4,116,882
463 4,116,883
470 4,116,884
532 4,116,885

CLASS 256

24 4,116,420

CLASS 260

2 A 4,116,887
5 4,116,895
17 R 4,116,896
17.4 GC 4,116,899
17.4 R 4,116,897
4,116,898
18 EP 4,116,900
19 UA 4,116,901
22 A 4,116,906
22 CB 4,116,903
4,116,905
22 R 4,116,904
22 TN 4,116,902
23 XA 4,116,907
4,116,908
23.7 R 4,116,909
25 4,116,910
28.5 A 4,116,911
29.2 N 4,116,941
29.4 UA 4,116,912

29.6 E 4,116,913
30.6 R 4,116,914
31.4 EP 4,116,915
33.2 R 4,116,916
33.6 AQ 4,116,917
37 P 4,116,918
37 SB 4,116,919
4,116,920
38 4,116,921
40 R 4,116,922
4,116,924
42.18 4,116,925
45.7 P 4,116,926
45.75 B 4,116,931
4,116,934
45.75 N 4,116,933
45.8 N 4,116,930
45.8 NT 4,116,929
45.8 NZ 4,116,927
4,116,928
45.95 R 4,116,932
112 R 4,116,948
112.5 R 4,116,949
4,116,950
4,116,951
145 B 4,116,952
157 4,116,953
162 4,116,954
192 4,116,955
239 BD 4,116,956
239.3 P 4,116,957
290 V 4,116,968
293.57 4,116,961
293.63 4,116,962
293.69 4,116,963
294.8 C 4,116,964
294.9 4,116,965
4,116,966
295.5 R 4,116,967
306.8 R 4,116,969
307 FA 4,116,970
308 D 4,116,971
326.1 4,116,972
326.11 R 4,116,973
332.2 A 4,116,974
4,116,975
343.3 R 4,116,976
343.6 4,116,977
345.2 4,116,978
345.3 4,116,979
346.3 4,116,980
346.71 4,116,981
346.75 4,116,983
347.7 4,116,982
348.12 4,116,984
397.2 4,116,985
401 4,116,986
410.9 R 4,116,987
413 4,116,988
4,116,989
429 J 4,116,990
439 R 4,116,991
448 A 4,116,992
448.2 E 4,116,993
449 R 4,116,994
449.6 M 4,116,995
4,116,996
463 4,116,997
465 D 4,116,998
465 H 4,116,999
465.1 4,117,000
465.8 R 4,117,001
4,117,002
510 4,117,003
513.6 4,117,004
544 D 4,117,006
544 Y 4,117,007
545 R 4,117,008
553 E 4,117,009
561 S 4,117,010
570.5 P 4,117,011
570.8 R 4,117,012
585 A 4,117,013
586 C 4,117,015
586 R 4,117,014
593 R 4,117,016
609 R 4,117,017
649 R 4,117,019
668 C 4,117,020
669 A 4,117,021
669 P 4,117,022
671 R 4,117,023
4,117,024
4,117,026
681.5 4,117,025
824 R 4,117,027
825 4,117,028
836 4,117,029
837 R 4,117,030
4,117,038
838 4,117,031
857 PE 4,117,032
860 4,117,033
873 4,117,034
875 4,117,039
876 B 4,117,035
878 R 4,117,036
880 B 4,117,037
899 4,117,040
927 N 4,117,041
930 4,117,042
938 4,117,043

CLASS 261

30 4,117,044
4,117,045
44 C 4,117,046
91 4,117,047
93 4,117,048
111 4,117,049

CLASS 264

25 4,117,050
29.1 4,117,051
30 4,117,052
36 4,117,053
40.1 4,117,054
56 4,117,055
57 4,117,056
63 4,117,057
65 4,117,058
82 4,117,059
4,117,060
89 4,117,061
94 4,117,062
102 4,117,063
103 4,117,064
105 4,117,065
117 4,117,066
119 4,117,067
130 4,117,068
153 4,117,069
234 4,117,070
256 4,117,071
288 4,117,072
349 4,117,073

CLASS 266

45 4,116,421
104 4,116,422
200 4,116,423

CLASS 269

55 4,116,424
152 4,116,425
307 4,116,426

CLASS 270

54 4,116,427

CLASS 271

14 4,116,428
173 4,116,429
177 4,116,430
236 4,116,431

CLASS 272

31 A 4,116,432
85 4,116,433
93 4,116,434

CLASS 273

29 A 4,116,437
29 R 4,116,436
30 4,116,438
59 A 4,116,439
81.4 4,116,440
85 G 4,116,441
89 4,116,442
95 R 4,116,443
101.2 4,116,444
161 4,116,445
181 F 4,116,446
183 B 4,116,447
186 A 4,116,448
240 4,116,449
249 4,116,450

CLASS 277

116 4,116,451
205 4,116,452

CLASS 279

4 4,116,453
62 4,116,454

CLASS 280

7.12 4,116,455
33.99 B 4,116,456
166 4,116,457
474 4,116,458
4,116,459
478 R 4,116,460
605 4,116,461
614 4,116,462
615 4,116,463
647 4,116,464
4,116,465
736 4,116,466
764 4,116,467

CLASS 281

7 4,116,468

CLASS 282

23 R 4,116,469

CLASS 283

66 A 4,116,470

CLASS 285

1 4,116,471
4 4,116,472
5 4,116,473
110 4,116,474
133 R 4,116,475
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247	4,117,082
253	4,117,083
	4,117,084
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	62	249,691
	68	249,693
	125	249,694
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	99	249,700
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	4,116,287	9 :	4,116,224		4,116,258		4,116,379		4,117,053		4,117,183
	4,116,306		4,116,383		4,116,303		4,116,401		4,117,055		4,117,225
	4,116,326		4,116,387		4,116,331		4,116,554		4,117,398		4,117,237
	4,116,327		4,116,546		4,116,340		4,117,203	16 :	4,116,421		4,117,263
	4,116,359		4,116,572		4,116,348		4,117,207		4,116,496		4,117,264
	4,116,374		4,116,723		4,116,352		4,117,274	17 :	Re.29,780		4,117,276
	4,116,386		4,117,138		4,116,407	09 :	Re.29,778		Re.29,788		4,117,279
	4,116,394		4,117,306		4,116,432		4,115,935		4,115,901		4,117,291
	4,116,504		4,117,466		4,116,439		4,115,938		4,115,902		4,117,302
	4,116,510	01 :	4,115,965		4,116,444		4,116,107		4,115,926		4,117,309
	4,116,517		4,116,291		4,116,455		4,116,109		4,115,951		4,117,313
	4,116,523		4,116,404		4,116,479		4,116,199		4,115,957		4,117,334
	4,116,595		4,116,634		4,116,482		4,116,406		4,115,966		4,117,373
	4,116,647		4,117,387		4,116,503		4,116,525		4,115,997		4,117,395
	4,116,663	02 :	4,115,924		4,116,518		4,116,686		4,116,001		4,117,400
	4,116,668	04 :	4,115,928		4,116,536		4,116,760		4,116,007		4,117,454
	4,116,711		4,116,148		4,116,600		4,116,836		4,116,062		4,117,461
	4,116,715		4,116,433		4,116,604		4,116,847		4,116,081		4,117,518
	4,116,720		4,116,664		4,116,677		4,117,012		4,116,156		4,117,526
	4,116,732		4,117,459		4,116,718		4,117,230		4,116,201		4,117,544
	4,116,745	05 :	4,116,349		4,116,742		4,117,317		4,116,205		4,117,551
	4,116,748		4,116,442		4,116,773		4,117,460		4,116,214	18 :	Re.29,786
	4,116,780	06 :	4,115,873		4,116,823		4,117,549		4,116,227		4,115,942
	4,116,793		4,115,878		4,117,013	10 :	4,115,947		4,116,233		4,115,954
	4,116,794		4,115,880		4,117,043		4,116,278		4,116,265		4,115,977
	4,116,841		4,115,883		4,117,049		4,116,607		4,116,280		4,116,082
	4,116,867		4,115,884		4,117,141		4,116,654		4,116,283		4,116,139
	4,116,871		4,115,885		4,117,153		4,116,804		4,116,298		4,116,175
	4,116,873		4,115,888		4,117,166		4,117,033		4,116,321		4,116,245
	4,116,937		4,115,891		4,117,201		4,117,041		4,116,330		4,116,281
	4,116,949		4,115,914		4,117,202		4,117,498		4,116,341		4,116,410
	4,116,950		4,115,930		4,117,234	11 :	4,116,220		4,116,412		4,116,613

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44 : 4,115,990 4,116,015 4,116,512 4,117,448 4,117,261 4,116,620
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6 : 249,633 249,662 249,740 27 : 249,598 249,695 48 : 249,605
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